The Impact of Interventional Change Techniques on an Internet Banking Cross-functional Team

A thesis

submitted in fulfillment

of the requirements of the degree

of

Doctor of Philosophy

at

The University of Waikato

by

Chansit Siritanachot

The University of Waikato

July 2008

Abstract

This study investigates the team aspects of a process improvement project situated in an Internet banking system maintenance and modification phase. To investigate how team processes could be improved in this context, four interventional change techniques were introduced and implemented during an action research study in which the researcher was included as one of the team members and participated during group meetings and discussions.

Internet banking is an important Internet-delivered service which is expected to provide benefits for both commercial banks and bank customers. Internet banking allows bank customers to have the freedom to perform their financial activities at their convenience. Developing, maintaining, and improving Internet banking systems requires large amounts of investment to maintain high levels of Internet banking service quality, and the maintenance and modification phase of the overall lifecycle cost is a considerable part of this investment. Therefore, in order to ensure high levels of usability, reliability, and quality for these Internet banking services, commercial banks need to make significant investments in the maintenance and modification phases of their Internet banking systems' lifecycle.

The four interventional change techniques used in this study were: departmental participation, equal participation, holistic scenario, and management support. The four techniques were found to be influential in developing process improvements in the maintenance and modification phase of Internet banking systems. These techniques generated several significant improvements which directly affected the way team members managed their work. The significant contributions of these interventional change techniques were: the creation of cross-functional multilevel teams, development of effective departmental participation and communication techniques, extended scope and knowledge by the team members of Internet banking systems, an increase in team learning and understanding, techniques to change problem structure, and an "end to end" problem-solving approach.

These contributions also directly improved the performance of the Internet banking systems maintenance team, and there was a significant improvement in the outcomes of the Internet banking systems maintenance and modification phase.

Acknowledgements

This thesis would not have been possible without the support and encouragement of a large number of people.

Firstly, I would like to express my appreciation to my supervisory panel of Professor Bob McQueen, Dr. Stuart Dillon, and Associate Professor Jan Robertson for their knowledge, guidance, direction, and understanding over the course of this thesis.

Secondly, I am particularly grateful to Associate Professor Paul Childerhouse for his friendship, support, and advice. The sympathy and encouragement offered during the low times over those wonderful meals of home grown pork chops and bacon were instrumental in my finishing this work. You were my Gandalf.

I would also like to acknowledge my proof reader Jennifer Buckle. The hours Jennifer spent editing this thesis vastly improved upon my “Thai-English”.

This research could not have been completed without the cooperation of the Bank of Asia Public Company Limited. I would like to acknowledge and thank all the action research group members who participated in the Internet banking systems maintenance and modification phase process improvement.

I would also like to gratefully acknowledge the absolutely awesome support, both financially and emotionally, of my family. To my sister, I would like to say thank you for looking after our beloved parents while I was in New Zealand studying. To my parents, thanks for your unconditional love and support over the course of this journey. I wish to also give special thanks to my girlfriend, Tu, who waited patiently and listened nonjudgementally to all my problems, anxieties, and frustrations during the stressful periods of this PhD study.

Lastly, and most importantly, to my grandmother who passed away during the course of this study. I am saddened I am not able to take my graduation photograph with you. To you I dedicate this thesis. You will be forever in my memory, grandma.

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Chapter 1 Introduction

This chapter provides the general information regarding this thesis beginning with the motivation for the research. The research opportunity is then identified and the central and subresearch questions proposed. A brief research design is presented showing how this research was conducted, and the final section presents the thesis overview.

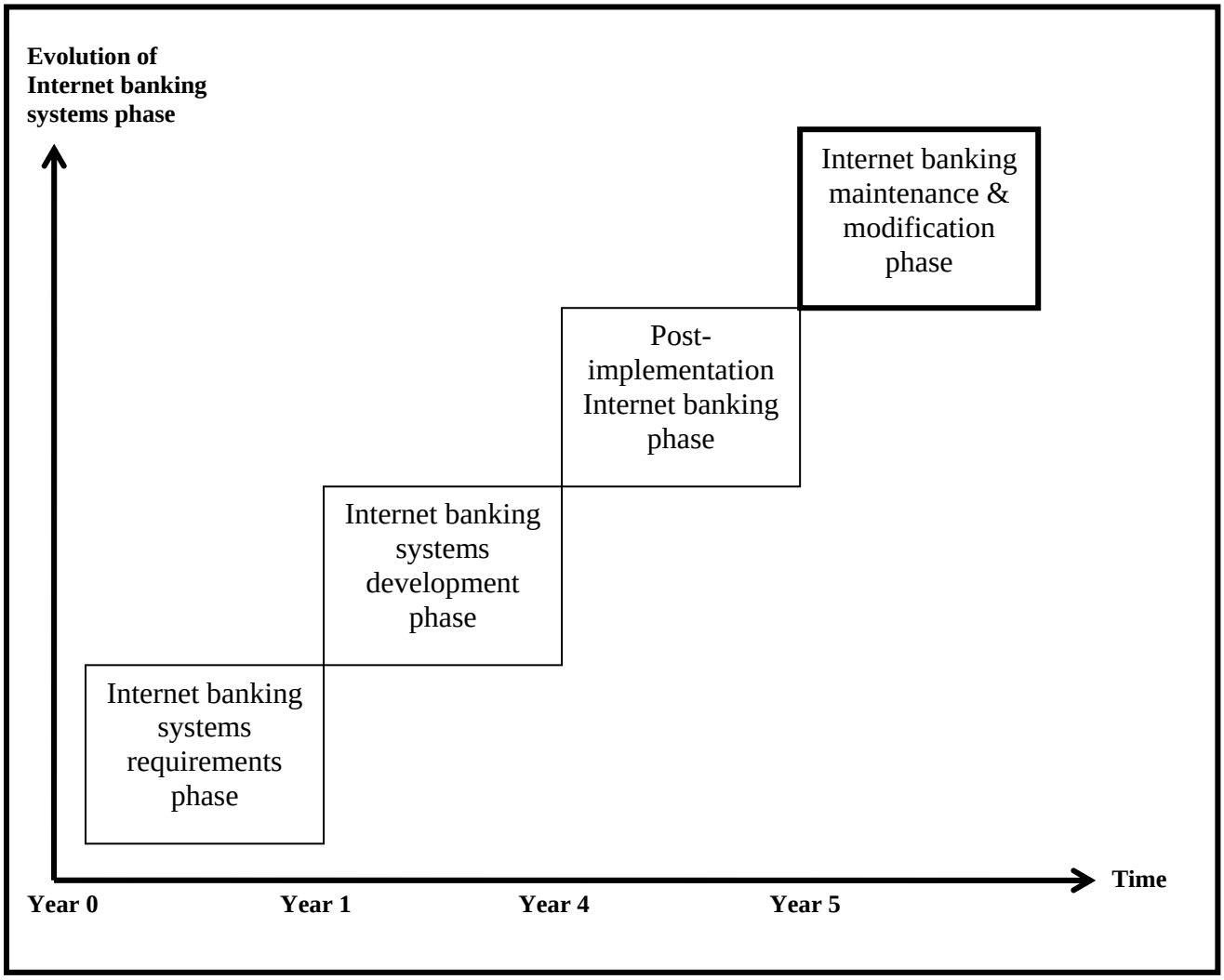
1.1 Research motivation and rationale

This research investigates the process improvement of Internet banking systems during the development, maintenance and modification phase using four interventional change techniques and a cross-functional multilevel team. The scope and focus of the research is shown in Figure 1.1.

Figure 1.1 shows all the phases of the Internet banking systems development process. There are four main phases in this process: requirements, development, postimplementation phase, and maintenance and modification. This research investigates the maintenance and modification phase -- the final phase of the entire Internet banking systems development process. Therefore, the central area of this study will be located within the maintenance and modification phase of the Internet banking systems development process. The unit of this study is the Internet systems development team that performs the maintenance and modification activities. The main purpose for this research is to investigate how this phase can be improved. There are several reasons why the Internet banking maintenance and modification phase is worth investigating; the rationales are as follows:

- Lack of Internet banking maintenance and modification phase in Internet banking literature
- Development of Internet banking systems
- Requirements for maintenance and modification
- Role of the development team

Figure 1.1:
Research scope of this study



1.1.1 Lack of Internet banking maintenance and modification phase in Internet banking literature

The researcher reviewed over 100 journal articles from various publications between 1998 and 2007. The most recent journal article, Shao (2007), was published in August 2007. It reviews 54 articles from 1998 to 2006 and presents a summary of, and trends in, Internet banking research. The researcher goes further than Shao by focusing on the contents of previous journals. Two main topics in the Internet banking research domain have been highly researched. These are the factors and attitudes influencing the adoption of Internet banking, and Internet banking development and

implementation by banks. A summary of the publications found in this research is shown in Table 1.1.

Table 1.1:

Summary of topic found in literature review

Topics of research in Internet banking domain	**Number of journals**
Factors and attitudes influencing the adoption of Internet banking	32
Success factors in banks development and implementation of Internet banking	20
TRA, TPB, and TAM as Internet banking adoption theoretical models	8
Internet banking security	5
Resistance to adoption of Internet banking	3
Continued use of Internet banking	4
Internet banking phishing attachments	2
Internet banking websites	3
Internet banking user profiles or demography	3
Internet banking overview	5
Internet banking service quality	5
Internet banking publication trends	1
Total	91

Table 1.1 shows that factors and attitudes influencing the adoption of Internet banking and success factors in developing and implementing Internet banking by banks are the most popular topics in the Internet banking research domain. The use of TRA, TPB and TAM as theoretical models for Internet banking acceptance and adoption is well accepted and acknowledged in this domain (Chau & Lai, 2003; Cheng, Lam, & Yeung, 2006; Lai & Li, 2005; Liao, Shao, Wang, & Chen, 1999; Pikkarainen, Pikkarainen, Karjaluoto, & Pahnila, 2004; Shih & Fang, 2004, , 2006; Suh & Han, 2002). Table 1.2 shows the authors who publish in the topic areas listed.

Table 1.2:

Summary of publications in Internet banking topics

Internet banking research topics	**Publications: authors and years**
Factors and attitudes influencing the adoption of Internet banking	(Akinci, Aksoy, & Atilgan, 2004; Awamleh, 2005; Bauer & Hein, 2006; Bradley & Stewart, 2002; Chung & Paynter, 2001; Devlin & Yeung, 2003; Eriksson, Kerem, & Nilsson, 2005; Gerrard & Cunningham, 2003; Howcroft, Hamilton, & Hewer, 2002; Jaruwachirathanakul & Fink, 2005; Karjaluoto, Mattila, & Pento, 2002; Kolodinsky, Hogarth, & Hilgert, 2004; Lang & Colgate, 2003; Laukkanen, 2006; Lee, Kwon, & Schumann, 2005; Liao & Cheung, 2002; Ndubisi & Sinti, 2006; Nielsen, 2002; Nor & Pearson, 2007; Rexha, Kingshott, & Shang Aw, 2003; Rotchanakitumnuai & Speece, 2003, , 2004; Sathye, 1999; Singh, 2004; Suganthi, Balachandher, & Balachandran, 2001; Tan & Teo, 2000; Tatnall & Lepa, 2003; Teo, Lim, & Lai, 1999; Wan, 2005; Wungwanitchakorn, 2002; Yousafzai, Pallister, & Foxall, 2003)
Success factors in developing and implementing Internet banking by banks	(Aladwani, 2001; Ayadi, 2006; Bradley & Stewart, 2002; Centeno, 2004; Chiemeke, Evwiekpaefe, & Chete, 2006; Corrocher, 2006; Courchane, Nickerson, & Sullivan, 2002; DeYoung, 2005; DeYoung, William, & Daniel, 2007; Durkin & O'Donnell, 2005; Flavian, Guinaliu, & Torres, 2005; Goi, 2006; Gurau, 2002; Hway-Boon & Yu, 2003; Koedrabruen & Raviwongse, 2002; Malhotra & Singh, 2007; Mols, Bukh, & Neilsen, 1999; Mols, 1999; Shah & Siddiqui, 2006; Simpson, 2002; Stamoulis, Kanellis, & Martakos, 2002)
TRA, TPB, and TAM as Internet banking adoption theoretical models	(Chau & Lai, 2003; Cheng, Lam, & Yeung, 2006; Lai & Li, 2005; Liao, Shao, Wang, & Chen, 1999; Pikkarainen, Pikkarainen, Karjaluoto, & Pahnila, 2004; Shih & Fang, 2004, , 2006; Suh & Han, 2002)
Internet banking security	(Bughin, 2004; Claessens, Dem, DeCock, Preneel, & Vandewalle, 2002; Hiltgen, Kramp, & Weigold, 2006; Hutchinson & Warren, 2003; Kolletzki, 1996)
Resistance to adoption of Internet banking	(Durkin, Howcroft, O'Donnell, & McCartan-Quinn, 2003; Kuisma, Laukkanen, & Hiltunen, 2007; Mattila, Karjaluoto, & Pento, 2003)

Internet banking research topics	Publications: authors and years
Continued use of Internet banking	(Curry & Penman, 2004; Eriksson & Nilsson, 2007; Guerrero, Egea, & Gonzalez, 2007; Walker & Johnson, 2005)
Phishing of Internet banking	(Altintas & Gursakal, 2007; Gouda, Liu, Leung, & Alam, 2007)
Internet banking websites	(Diniz, Porto, & Adachi, 2005; Jayawardhena & Foley, 2000; Waite & Harrison, 2004)
Internet baking user profiles and demography	(Akinci, Aksoy, & Atilgan, 2004; Berger & Gensler, 2007; Cheah, Sanmugam, & Tan, 2005)
Internet banking overview	(Chou & Chou, 2000; Seitz & Stickel, 1998; Sheshunoff, 2000; Yakhlef, 2001)
Internet banking service quality	(Broderick & Vachirapornpuk, 2002; Janda, Trocchia, & Gwinner, 2002; Joseph & Stone, 2003; Maenpaa, 2006; White & Nteli, 2004)
Internet banking publication trends	(Shao, 2007)

The information in Table 1.2 shows that there has been no previous investigative research investigation in the area of the phase of Internet banking systems development, maintenance, and modification.

1.1.2 Development of Internet banking systems

Internet banking is characterized by large initial investment (Corrocher, 2006). Internet banking systems are known as information systems that provide flexibility and benefits for commercial banks and their customers. A high level of investment is required to develop Internet banking systems and, in order to provide a high level of usability, reliability, and quality in Internet banking services, commercial banks need to make massive investments into information systems development. Tan and Teo (2000) present the costs for a bricks and mortar branch and an Internet banking service. On average it costs less than US$25,000 to create a web presence, and less than US$25,000 a year to maintain a website. The complete function of Internet banking costs between US$1 and 2 million. In contrast, a bricks and mortar bank

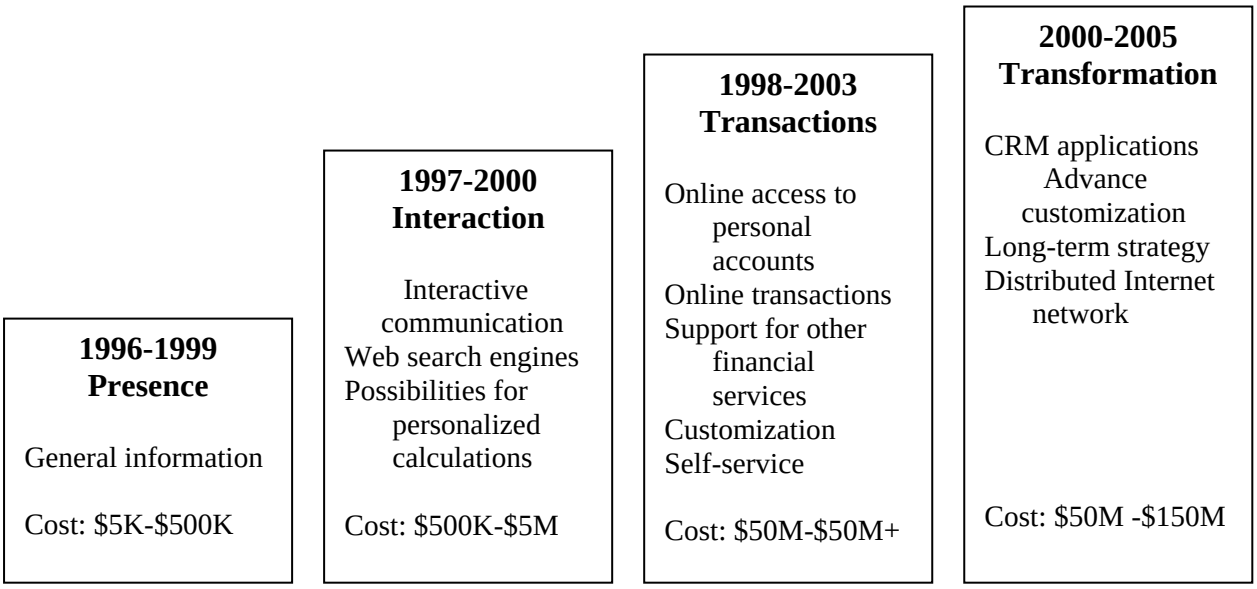
branch set-up costs approximately US$1.5 to US$2 million and requires US$350,000 to US$500,000 a year to operate.

Gurau (2002) notes that, in general, the role and content of a bank's website evolves over time. Most banks begin with a simple web page which contains and presents the bank's information and its services. Introduced later are online communication facilities and then a full range of Internet banking services. Therefore, the cost of an online banking application and its development increases with the complexity of the website. The relationship between website cost and complexity is shown in Figure 1.2.

It is clear that Internet banking systems development requires high investment in order to provide Internet banking services. In order to encourage bank customers to use and exploit the full benefit of the Internet banking service, Internet banking systems need to be well developed and maintain a high level of usability, reliability, and availability. Internet banking services providers need to ensure a high level of Internet banking service quality which includes creditability of the Internet banking service provider, product variety/diverse features, security of the bank's website, responsiveness of service delivery, and ease of use of the bank's website (White & Nteli, 2004). Internet banking services providers not only invest in Internet banking systems development but also in the maintenance and modification phase of their Internet banking systems development.

Figure 1.2:

Relationship between website cost and complexity in Internet banking



Source: Tuchila, (2000) (as cited in Gurau, 2002, p. 287).

1.1.3 Requirements for maintenance and modification

In this research, the modification and maintenance process of the Internet banking maintenance and modification phase is investigated. It has long been recognized that the maintenance phase consumed a large amount of time and resources (Boehm, 1976; Swanson & Beath, 1989). Boehm found that the level of required effort for maintenance of systems, in comparison with the original systems development process, was typically quoted as 70-80% (Boehm, 1976). Therefore, a large amount of time, effort, and resources were used for keeping systems going and performing for organizations. This level of support implied that systems were typically unstable and constantly changed over time. In addition, the maintenance phase of systems was costly and time-consuming (Fitzgerald, Philippides, & Probert, 1999). The investment to maintain information systems cost more than their development. Kaplan (2002) and Pressman (2001) agree that there has been a significant increase in the cost of systems maintenance from 1960s to the present day. During the 1960s and 1970s, the maintenance cost was 35-40%; the cost increased to 40-60% during the 1980s and 1990s. From the 1990s to the present, the system maintenance cost was recorded as

70-80% of the information system budget. It is clear that the systems maintenance phase is a significant phase for systems development and systems performance improvement.

To maintain and modify Internet banking systems requires a high level of investment in time, effort, and resources. It is necessary to improve the Internet banking maintenance and modification phase. An effective and efficient Internet banking maintenance and modification process will speed up the lifecycle of the Internet banking maintenance and modification process. Time, effort, and resources will be used more effectively and efficiently. Therefore, an Internet banking development team needs to change its Internet banking maintenance and modification process. However, to improve this process, the Internet banking systems development team needs to change and improve its operational process. This team is vital for Internet banking maintenance and modification process improvement.

1.1.4 Role of the development team

> *All information systems require people to construct, work with, and operate [them] . . . even a completely automated information system (if it were possible to construct such a thing as in a fully automated workshop), would still require people to provide back-up and for trouble shooting. In practice, then, information systems rely on people using and interacting with these artifacts. (Land, 1992, p. 6)*

This statement argues that people are a crucial part for all information systems because information systems are created and maintained by them. People play significant roles in information systems. This research investigates how implementational change techniques assist an information systems development team to improve information systems development. The reason is that all information systems need people to operate and maintain them. Internet banking systems require an Internet banking systems development team to operate, modify, and maintain those systems at the accepted level of services quality. It is important for an Internet banking maintenance and modification team to perform exceptionally well in order to maintain and enhance expensive information systems like Internet banking systems.

The following sections will present some previous research in the Internet banking domain.

1.2 Internet banking research domain

1.2.1 Internet banking overview

Internet banking is one kind of information system that has a significant impact on the financial sector (Booz, Allen, & Hamilton, 1997; Cuevas, 1998). Internet banking is one of the newest innovative products in electronic banking services and has immense capabilities to create a win-win situation for both commercial banks and customers (Daniel, 1999; Dannenberg & Kellner, 1998). It is described as the provision of information or services about banks to their customers via the World Wide Web. Well-developed systems allow customers to gain access to and execute transactions at their convenience. Internet banking provides one of the most convenient forms of banking activities regardless of geographical boundaries. The primary objective of offering online-services is to provide 24 hour, 7 day service, irrespective of location.

In general, the definitive Internet banking model and structure has not yet been ascertained. Different financial institutes, academic scholars, and people vary in their interpretation of Internet banking forms. Hennigan (1997) presents four categories of Internet banking: net presence, interactivity, home banking, and Internet banking. Other research states that Internet banking can be conveniently categorized under five different categories: view-only functions, account control functions, new services, application for new banking services, and integration and reconciliation (Jayawardhena & Foley, 2000).

The major driving force for utilizing the Internet as a medium to offer innovative banking channels arises from a competitive environment and technological change (Daniel, 1999; Jayawardhena & Foley, 2000; Stamoulis, 2000; Wisner & Corney, 2001). For this reason banks have to introduce or offer online banking as an alternative delivery channel. Jayawardhena and Foley (2000) present the advantages of Internet banking. It provides cost savings to customers and banks, an increased customer base, and enables mass customization, marketing and communication, innovation, and the development of noncore businesses.

Cost savings are savings on operational costs and set-up costs; these cost savings claim to be a significant advantage from using the Internet as a delivery channel. In terms of operational costs, Internet banking provides a potentially lower cost than bricks and mortar branch banking does (Booz, Allen, & Hamilton, 1997; Cuevas, 1998; Jasimuddin, 2001; Jayawardhena & Foley, 2000; Nehmzow, 1997; Sathye, 1997, , 1999; Tan & Teo, 2000). The study by Booz et al. (1997) on Internet banking shows that the Internet banking channel has a significantly lower cost structure than does a traditional delivery channel. Internet banking can operate at the expense ratio of 15-20% compared to 50-60% for the average bank. The average cost of an Internet banking transaction is 13 cents or less, whereas it costs 26 cents for personal computer banking service, 54 cents for a telephone banking transaction, and $1.08 for a bank branch transaction. This statement is supported by Tan and Teo (2000) who, when recording the set-up costs for a bricks and mortar branch and an Internet banking service, quote the same sums. Tan and Toe (2000) also add that Internet banking provides an opportunity for banks to increase their customer base by attracting new customers and retaining existing customers; to enable mass customization by allowing customers to personalize and customize their needs and usage; to market and communicate by utilizing the bank's website 24 hours a day; to deliver new services and products in an innovative manner, and to expand services and products to noncore businesses, for example, insurance and stock brokerage.

Stamoulis (2000) illustrates how Internet banking fits into an Internet commerce market structural model. Internet banking is divided into content providers and enablers. Most banks operate a website to provide a catalogue of their products and services for promotion and communication purposes. A growing number of banks worldwide offer electronic banking/web banking/Internet banking; therefore, customers can manipulate their personal finances and execute transactions via the Internet. Banks are increasingly establishing payment infrastructure with various security mechanisms, for example, secure socket layer (SSL) and secure electronic transaction (Sethi, Smith, & Park, 2001).

Internet banking has been introduced by the majority of commercial banks around the world. In Western and European countries, Internet banking has gained high

popularity among bank customers. The number of Internet banking customers has increased significantly in the past 5 years (Mols, 2000; Nehmzow, 1997; Polatoglu & Ekin, 1999; Seitz & Stickel, 1998).
However, implementation of Internet banking has been delayed as a result of some major concerns such as security and perceived risk. Many other factors have also been found to have a strong influence on the adoption of Internet banking. These factors are: security and trust concerns, computer and Internet access, awareness of benefits, resistance to change, service quality, aspects of cost, ease of use, and response and download time (Chung & Paynter, 2001; Sathye, 1999; Suganthi, Balachandher, & Balachandran, 2001).

In Asian society, the cultural aspect plays a significant role in people's attitudes, beliefs, and behavior. Asian culture is labeled as having a tendency to avoid new developments in banking, especially if the systems involve risk (Herbig & Dunphy, 1998; Low & Shi, 2001; Morakul & Wu, 2001; Straub, Keil, & Brenner, 1997). Hofstede's cultural dimensions (1984) posit that Asians are not tolerant to perceived high risk. Perceived risk is one of the most critical characteristics of Internet banking. For Internet banking to be adopted in Asian society, Tan and Teo (2000) suggest that governments need to provide strong support in terms of education, knowledge, infrastructure, access, and connectivity. Many countries in the Asian region such as South Korea, Hong Kong, Malaysia, and Singapore have achieved a relatively high level of customer acceptance. These countries receive great support from their governments and the governments encourage and persuade people to utilize the benefits of Internet technology and adopt Internet banking (Gerrard & Cunningham, 2003; John & Gorman, 2002; Liao, Shao, Wang, & Chen, 1999; Soh, Mah, Gan, Chew, & Reid, 1997; Suganthi, Balachandher, & Balachandran, 2001; Teo, Lim, & Lai, 1999).

1.2.2 Internet banking: Prior research in a Western context

The majority of empirical research has been conducted in the American and European contexts (Bradley & Stewart, 2002; Broderick & Vachirapornpuk, 2002; Cuevas, 1998; Daniel, 1999; Dannenberg & Kellner, 1998; Diniz, 1998; Hennigan, 1997;

Hutchinson & Warren, 2003; Jayawardhena & Foley, 2000; Jun & Cai, 2001; Mols, 2000; Nehmzow, 1997; Ramaswami, Strader, & Brett, 1998; Wisner & Corney, 2001). Chiemeke, Evwiekpaefe, and Chete (2006) investigate the possibility of Internet banking adoption in Nigeria. The authors propose that the main factors that inhibit the adoption of Internet baking are security and inadequate operational facilities which include proper telecommunications and power supply. Most banks offer the basic level of interface such as an information provider site and the security level is low. Most banks did not have 128 bit Secure Sockets Layer (SSL).

Bauer and Hein (2006) confirm that perceived risk is the factor that makes customers reluctant to adopt Internet banking. They also discover that older customers are less likely to adopt Internet banking whereas younger customers tend to be early adopters because they have more tolerance of high risk. Berger and Gensler (2007) conducted survey research among German bank customers. Their findings show the profile of German online banking customers and their behavior. Berger and Gensler agree and support Bauer and Hein (2006) that online banking customers tend to be younger, to have white collar jobs, high net personal income, higher telecommunication usage, and to be willing to accept certain risks.

The issue of phishing attack and Internet fraud was investigated in Turkey. Altintas and Gursakal (2007) investigated the relationship between bank customers' perception of service quality as regards phishing attack and Internet fraud. The authors suggest that banks need to handle these problems within the complaint-handling context and communicate with customers because when customers complain that their bank is not being helpful, customer trust is damaged.

The key determinants of Internet banking service quality were studied by Jun and Cai (2001). The authors use content analysis to identify the distinct key service quality between Internet-only banks and traditional banks offering Internet banking service. The 17 dimensions of Internet banking service quality are classified into three categories. The first category is customer service quality which contains reliability, responsiveness, competence, accessibility, courtesy, credibility, communication, understanding the customer, collaboration, and continuous improvement. Online system quality is the second category. It consists of content, accuracy, ease of use,

timeliness, aesthetics, and security. The final category is banking service product quality which covers product variety and diverse features. The study found that there is no significant difference between Internet-only banks and traditional banks offering Internet banking service in terms of Internet banking service quality. However, the study presents four main sources of satisfaction and dissatisfaction which are reliability, responsiveness, accessibility, and accuracy.

Awamleh (2005) investigated the determinants of customer satisfaction in the United Arab Emirates and his research findings show that security of Internet banking transactions and convenience have a significant impact on customer satisfaction. Devlin and Yeung (Devlin & Yeung, 2003) study the motivations for switching to Internet banking. Their findings show some interesting results such as the fact that bank charges and overdraft interest rates do not have a significant effect on Internet banking adoption propensity, and that a high level of satisfaction with in-branch services is associated with a lower propensity to switch to Internet banking. Akinci, Aksoy, and Atilgan (2004) studied the attitudes and adoption of Internet banking among highly educated consumers. Their results show that Internet banking users are middle-aged, male, more technology-oriented, and convenience-minded consumers. In contrast, nonInternet banking users are younger (below 30 years of age), more traditional channel oriented, and hesitant consumers with a lack of confidence in Internet banking services compared to services delivered at the bank branch. Lee, Kwon, and Schumann (2005) suggest that banks need to identify consumer segments more effectively because prospective adopters and persistent nonadopters are qualitatively distinct segments and should not be lumped together. The research findings show that the difference between adopters and prospective adopters is perceptual, whereas the difference between prospective adopters and persistent adopters reflects varying levels of technological sophistication. Therefore, the two nonadopter categories are clearly in different market segments, so banks need different strategies to encourage them to adopt Internet banking.

In Denmark, Mols (2000) conducted survey research by distributing questionnaires to 60 key managers in the largest retail banks in Denmark. The survey shows that Internet banking was predicted to become a more important channel in the near future, whereas the other channels were predicted to become less important distribution

channels for retail banks. Mattila, Karjaluoto, and Pento (2003) conducted survey research on Internet banking in Finland. They found that Internet banking is the third most popular payment method and over 39.8 % of retail transactions are made via Internet banking. Their study shows that difficulties in using computers and lack of personal skill in e-banking services are the key barriers for Internet banking adoption. The extension of TAM on consumer acceptance of online banking is investigated by Pikkarainen, Pikkarainen, Karjaluoto, and Pahnila (2004). The main research findings indicate that Perceived Usefulness (PU) and the amount of information on online banking are the most influential factors to explain the usage of online banking. Eriksson, Kerem, and Nilsson (2005) confirm that perceived usefulness is central because Internet banking usage increases insofar as customers perceive it as useful and well-designed and easy to use. Customers will not use Internet banking if it is not perceived as useful. The customer-perceived value of e-financial services in Finland was studied by Laukkanen (2006). The research findings show that perceived convenience and efficiency are the most influential factors which lead customers to adopt e-financial services. In addition, privacy, preciseness/control and safety-related factors are important factors for the adoption of Internet fund transfer services.

Daniel (1999) notes that electronic banking or online banking is the newest delivery channel that is offered by commercial banks in many developed countries. This research confirms that 25% of retail banks in the UK and the Republic of Ireland are already providing an online transactional service and 50% of retail banks are currently testing and developing the online service, while the last 25% of retail banks are not providing and developing online services. The research also shows that organizational vision of the future and prediction of customer acceptance [when it is predicted to be very low] are the most important factors in their decision to develop an electronic delivery channel.

Polatoglu and Ekin (2001) conducted a survey research study in order to examine the factors influencing the adoption of an innovation and increased customer satisfaction in Turkey. This research adopted Rogers' attributes of innovation diffusion which consist of relative advantage, observability, trialability, complexity, compatibility, and perceived risk as the framework for discussion (Rogers, 1995). The findings of this research highlight three important dimensions of satisfaction: reliability, access, and

savings. A similar study was conducted by Nor and Pearson (2007). The theory of diffusion of innovation (IDT) is widely used to study the factors that influence the rate of new technology adoption. Trust plays a significant role in acceptance of an innovation. Nor and Pearson (2007) apply IDT and trust to the concept of Internet banking acceptance. The results indicate that trust, relative advantage, and trialability have a significant effect on attitude toward adoption of Internet banking. This positive attitude significantly influences the intention to adopt Internet banking.

In Australia, Sathye (1999) conducted survey research which attempts to identify the factors affecting the adoption of Internet banking. This research shows that security concerns, ease of use, awareness of service and its benefits, reasonable price, resistance to change, and availability of infrastructure are the factors that affect the adoption of Internet banking in Australia. However, security concerns, and a lack of awareness about Internet banking and its benefits are the outstanding factors which affect Internet banking adoption by Australian customers. Chung and Paynter (2001) evaluate Internet banking in New Zealand in terms of banking services. The seven online banks are evaluated in terms of their websites' effectiveness, functionalities, and Internet strategies. This study shows that security concerns, complication of Internet banking, response time, freedom from technical problems, and up-to-date information are found to inhibit the adoption of Internet banking in New Zealand.

1.2.3 Internet banking: Prior research in an Asian context

Some empirical research studies have been conducted in a nonWestern context. Suganthi et al. (2001) identify the factors that affect the rate of Internet banking adoption in Malaysia. This research shows that the factors affecting the adoption of Internet banking in Malaysia are Internet accessibility, reluctance to change, cost of computers and Internet access, trust in one's bank, security concerns, convenience and ease of use. The research findings also show that the higher the levels of accessibility, awareness, trust and security that exist, the higher the average value, and the greater the degree of accessibility, awareness, trusts, and security of Internet banking transactions respectively. In addition, the research also found that the high cost of computers made customers reluctant to change. Ndubisi and Sinti (2006) added

Internet banking site features (utilitarian orientation and hedonic orientation) into their research framework for testing customer attitude toward Internet banking adoption. The results show that the attitudinal factors (banking need, compatibility, complexity, trialability, and risk) play a significant role in Internet banking adoption. The findings also indicate that utilitarian orientation has more significant influence on adoption than hedonic orientation does. Goi (2006) studied the development of e-banking in Malaysia and the author argues that the successful development of e-banking is influenced by new marketing strategies E-Customer Relationship Management (E-CRM), development of technology, and support from the government.

The Singapore government provides strong support for mass literacy and adoption of the Internet in Singapore (Teo, Lim, & Lai, 1999). Tan and Teo (2000) adopt the Decomposed Theory of Planned Behavior (TPB) model developed by Taylor and Todd (1995) as a research-based model. The actual research model had minor modifications on antecedents of attitude. The authors adopt some additional characteristics of innovation, complexity, trialability, and risk taken from Rogers (1983). The research findings show that the greater the perceived relative advantage, perceived compatibility, experience with using the Internet, use of banking services and products, trialability of Internet banking, and lower risk undertaking, the greater the number of customers who are inclined more favorably to adopt Internet banking. Shih and Fang (2004) also adopt the TPB and their research findings indicate that only relative advantages and complexity are related to attitude to adopt Internet banking, while compatibility is not.

In Hong Kong, Wan (2005) found that ATM is the most frequently adopted banking channel, followed by Internet banking, branch banking and telephone banking. Liao, Shao, Wang, and Chen (1999) studied the adoption of virtual banking in Hong Kong. This research applies the TPB and adds behavioral beliefs and evaluations, normative beliefs and motivation, and control beliefs and facilitation as external variables. The research concludes that the TPB could only partially explain why attitudes are found to have a strong effect on the adoption of virtual banking. The antecedents of behavioral beliefs which are found to have a significant effect are relative advantage, ease of use, compatibility, and result demonstrability. Subjective norm and perceived

behavioral control were found to have no significant effect on intentions to use virtual banking. Extended Technology acceptance model (TAM) was tested by Chau and Lai (2003). The authors propose that personalization, alliance services, task familiarity, and accessibility have an influence on PU and PEOU. The research findings confirm that these factors are influential factors that foster a positive attitude toward accepting Internet banking. Lai and Li (2005) present interesting research findings, stating that male and female, old and young, IT expert and novice conceptualize the TAM construct (PEOU, PU, ITO, and ATT) in a similar way.

In South Korea, the Korean government provides great Internet infrastructure. Korean people have clearly taken advantage of the broadband infrastructure. The number of Internet banking customers is more than 12 million (John & Gorman, 2002). Suh and Han (2002) investigate the effect of trust on customer acceptance in Internet banking. The authors adopt TAM as a research framework and add the construct of trust as an additional construct in their research model. The study shows that trust has a significant impact on the acceptance of Internet banking.

1.2.4 Internet banking: Prior research in Thailand

Five previous research studies have been conducted in the Thai Internet banking context. Koedrabruen and Raviwongse (2002) present a prototype of retail Internet banking for Thai customers. The research shows that over 50% of respondents are keen to use some features of Internet banking service, for example, balance inquiry, bill payment, fund transfer, business information, and payment for goods purchased. Wungwanitchakorn (2002) adopts the diffusion of innovation theory (Rogers, 1983, , 1995) and Taylor and Todd's (1995) Decomposed model of Theory of Reasoned Action (TRA) to study the relationship between acceptance and customer characteristics of Internet banking adoption. This study presents six significant explanatory variables which associate with the intention to adopt Internet banking. The six variables are opinion leadership, relative advantage, complexity, trialability, compatibility, and telephone banking usage. Ongkasuwan and Tantichattanon (2002) conducted a comparative study of Internet banking in Thailand. This research compares Internet banking services available in 13 Thai commercial banks. Rotchanakitumnuai and Speece (2003) conduct in-depth interviews to probe barriers

to Internet banking adoption among corporate customers. The study proposes three main barriers. Trust is one of the most critical barriers to Internet banking adoption, and low reliability and distrust in service providers are the remaining two barriers found in this research. The authors also conduct further research on corporate customers in the area of perspective on business value of Internet banking. The study shows four benefits and three barriers that influence corporate customers in adopting Internet banking. The four benefits were information quality, information accessibility, information sharing, and transaction benefit and the three barriers are trust, legal support, and organizational barriers. Recent Internet banking research was conducted by Jaruwachirathanakul and Fink (2005). The research findings show that there are both controllable and uncontrollable factors that encourage Internet banking adoption. The controllable factors are features of the website and perceived usefulness, while the uncontrollable factor is perceived behavioral control, namely the external environment which includes gender, educational level, income, Internet experience, and Internet banking experience. Age was not included in this uncontrollable factor.

1.2.5 Internet banking research trends: 1998 to 2006

The most recent research study conducted reviews the trend of online research from 1998 to 2006 (Shao, 2007). Shao made a content analysis and examined the frequency, occurrence pattern, research topics and methodologies from 54 online banking articles. Shao's research findings indicate that there is an imbalance in publication sources, research perspectives, research methods, and sampling techniques in online banking research. The author concludes that online banking research studies need more diversified topics and methodologies for the future of online research. The following section will present some interesting results from these research findings, including publication trends, research methods, research perspective and research purpose, sampling population most often employed, and geographic area.

1.2.5.1 Shao: Publication trends

For publication trends, a total of 54 articles are identified from the publications spanning the 9 years from 1998 to 2006. Publication trend shows frequencies and

percentages of 54 articles by each journal. Table 1.3 shows the publications from each journal in three time periods of 1998-2000, 2001-2003, and 2004-2006.

Table 1.3:

Internet banking publication trends

	1998-2000		**2001-2003**		**2004-2006**		***Totals***	
Journals	**No.**	**%**	**No.**	**%**	**No.**	**%**	**No.**	***%***
International Journal of Bank Marketing (IJBM)	3	5.6	8	14.8	11	20.4	22	*40.7*
Journal of Internet Banking and Commerce (JIBC)	0	0	4	7	6	11.1	10	*18.5*
Journal of Financial Service Marketing (JFSM)	0	0	2	3.7	0	0	2	*3.7*
Internet Research (IR)	2	3.7	0	0	0	0	2	*3.7*
Electronic Markets (EM)	0	0	2	3.7	0	0	2	*3.7*
Others	2	3.7	14	25.9	0	0	16	*29.6*
Total	*7*	*13.0*	*30*	*55.5*	*17*	*31.5*	*54*	*100*

Source: (Shao, 2007, p.6)

Table 1.3 shows that IJBM and JIBC carry the highest proportion of online research. The total number of publications rose from 7during 1998-2000 to 17 during 2001 to 2003 and decreased to 16 during 2004-2006.

1.2.5.2 Research methods

Several methods are used in online research, for example, survey, content analysis, secondary data, in-depth interview, group study, observation, critique/essay, amongst others. Table 1.4 shows the frequency of each method during the three time periods 1998-2000, 2001-2003, and 2004-2006.

Table 1.4:

Research methods in Internet banking research

Research methods	**1998-2000**		**2001-2003**		**2004-2006**		***Total***	
	No.	**%**	**No.**	**%**	**No.**	**%**	**No.**	**%**
Survey	5	71.4	17	56.7	16	94.1	38	*70.4*
Content analysis	0	0	1	3.3	0	0	1	*1.9*
Experiment	0	0	0	0	0	0	0	*0*
Secondary data	1	14.3	4	13.3	2	11.8	7	*13*
In-depth interview	0	0	2	96.7	0	0	2	*3.7*
Group study	0	0	2	6.7	0	0	2	*3.7*
Observation	1	14.3	0	0	0	0	1	*1.9*
Critique/essay	0	0	2	6.7	1	5.9	3	*5.6*
Totals	*7*		*30*		*17*		*54*	*100*

Source: (Shao, 2007, p.6)

Table 1.4 shows that survey is the most popular and frequent method used in Internet banking research. The use of secondary data comes next. Interestingly, there is no use for experiment method in online research.

1.2.5.3 Research perspectives and purposes

The comparison between quantitative and qualitative research is reviewed. In terms of research purpose, description, exploration, and explanation are used as criteria for the research purpose. Table 1.5 shows the type of research perspective and research purpose from 1998 to 2006.

Table 1.5:

Research perspectives and purposes

Perspective	**1998-2000**		**2001-2003**		**2004-2006**		**Totals**	
	No.	**%**	**No.**	**%**	**No.**	**%**	**No.**	**%**
Quantitative	6	85.7	22	73.3	18	94.1	46	85.2
Qualitative	1	14.3	6	26.7	1	5.9	8	14.8
Totals	7	100	30	100	17	100	54	100

Purpose	1998-2000		2001-2003		2004-2006		Totals	
	No.	%	No.	%	No.	%	No.	%
Descriptive	3	42.9	11	36.7	9	553.0	23	42.6
Exploratory	0	0	13	43.3	0	0	13	24.1
Explanatory	4	57.1	6	20.0	8	47.0	18	33.3
Totals	7	100	30	100	17	100	54	100

Source: (Shao, 2007, p.6)

The quantitative perspective is the main research perspective in online research and 85.2% of online research studies adopt the quantitative perspective, while qualitative research is employed for only 14.8% of the studies. The descriptive purpose is the most popular for conducting online research, followed by the explanatory and exploratory.

1.2.5.4 Population sample

The sample group for online research includes bank customers, the general public, Internet users, bank managers, banks, and students. Table 1.6 shows the percentage of the most popular sampling population in online research.

The majority of online research uses bank customers as its main source for data collection. The general public, Internet users, and bank managers are also used. Banks are the least popular in all kinds of sample group, with less than 10 % of online data collected from banks.

Table 1.6:

Population samples

1998-2000 (N=7)	2001-2003 (N=30)	2004-2006 (N=17)	Overall ranking (N=54)
1. Bank customer (2) (28.6%)	1. Bank customer (10) (33.3%)	1. Bank customer (6) (35.3%)	1. Bank customer (18) (33.3%
2. Banks (2) (28.6%)	2. Bank managers (5) (16.7%)	2. Internet users (4) (23.5%)	2. General public (9) (16.7%)
3. General public (1) (14.3%)	3. General public (4) (13.3%)	3. General public (4) (23.5%)	3. Internet users (8) (14.8%)

4. Internet users (1) (14.3%)	4. Internet users (3) (10.0%)	4. Students (2) (11.8%)	4. Bank managers (7) (13.0%)
5. Bank managers (1) (14.3%)	5. Banks (3) (10.0%)	5. Bank managers (1) (5.9%)	5. Banks (5) (9.3%)

Source: (Shao, 2007, p.6)

1.2.5.5 Internet banking publications by geographic areas

Shao (2007) conducted online research studies in six main geographic areas. These are Europe, Asia, North America, South America, Australia, and Africa. Table 1.7 presents the percentage of online research studies that were conducted in these different geographic areas.

Table 1.7:

Internet banking publication based on geographic areas

Geographic areas	**1998-2000**		**2001-2003**		**2004-2006**		***Total***	
	No.	**%**	**No.**	**%**	**No.**	**%**	**No.**	***%***
Asia	1	14.3	8	26.7	10	58.8	19	*35.2*
Europe	4	57.1	14	46.7	2	11.8	20	*37.0*
North America	1	14.3	8	26.7	1	5.9	10	*18.5*
South America	0	0	0	0	0	0	0	*0*
Australia	1	14.3	0	0	1	5.9	2	*3.7*
Africa	0	0	0	0	3	17.6	3	*5.5*
Totals	*7*	*100*	*30*	*100*	*17*	*100*	*54*	*100*

Source: (Shao, 2007, p.6)

Europe has the highest number of publications in Internet banking research followed by Asia and North America.

In summary, based on Shao (2007) the majority of Internet banking research from 1998 to 2006 employed survey as the main research method, adopted quantitative as the research perspective, collected data from bank customers and conducted Internet banking research in Europe and Asia.

1.3 Research gap and opportunity

Internet banking research is an interesting research domain of social science research. The majority of Internet banking research studies investigate factors and attitudes which influence an intention to adopt Internet banking (Akinci, Aksoy, & Atilgan, 2004; Awamleh, 2005; Bauer & Hein, 2006; Bradley & Stewart, 2002; Chung & Paynter, 2001; Devlin & Yeung, 2003; Eriksson, Kerem, & Nilsson, 2005; Gerrard & Cunningham, 2003; Howcroft, Hamilton, & Hewer, 2002; Jaruwachirathanakul & Fink, 2005; Karjaluoto, Mattila, & Pento, 2002; Kolodinsky, Hogarth, & Hilgert, 2004; Lang & Colgate, 2003; Laukkanen, 2006; Lee, Kwon, & Schumann, 2005; Liao & Cheung, 2002; Ndubisi & Sinti, 2006; Nielsen, 2002; Nor & Pearson, 2007; Rexha, Kingshott, & Shang Aw, 2003; Rotchanakitumnuai & Speece, 2003, , 2004; Sathye, 1999; Singh, 2004; Suganthi, Balachandher, & Balachandran, 2001; Tan & Teo, 2000; Tatnall & Lepa, 2003; Teo, Lim, & Lai, 1999; Wan, 2005; Wungwanitchakorn, 2002; Yousafzai, Pallister, & Foxall, 2003). The other major area of investigation is success factors in developing and implementing Internet banking by banks (Aladwani, 2001; Ayadi, 2006; Bradley & Stewart, 2002; Centeno, 2004; Chiemeke, Evwiekpaefe, & Chete, 2006; Corrocher, 2006; Courchane, Nickerson, & Sullivan, 2002; DeYoung, 2005; DeYoung, William, & Daniel, 2007; Durkin & O'Donnell, 2005; Flavian, Guinaliu, & Torres, 2005; Goi, 2006; Gurau, 2002; Hway-Boon & Yu, 2003; Koedrabruen & Raviwongse, 2002; Malhotra & Singh, 2007; Mols, Bukh, & Neilsen, 1999; Mols, 1999; Shah & Siddiqui, 2006; Simpson, 2002; Stamoulis, Kanellis, & Martakos, 2002).

A review of the literature revealed that these two areas of research into Internet banking accounted for about 53 of the total of 92 articles. TRA, TPB, and TAM are used eight times as Internet banking adoption theoretical models (Chau & Lai, 2003; Cheng, Lam, & Yeung, 2006; Lai & Li, 2005; Liao, Shao, Wang, & Chen, 1999; Pikkarainen, Pikkarainen, Karjaluoto, & Pahnila, 2004; Shih & Fang, 2004, , 2006; Suh & Han, 2002). There are five articles on Internet banking security (Bughin, 2004; Claessens, Dem, DeCock, Preneel, & Vandewalle, 2002; Hiltgen, Kramp, & Weigold, 2006; Hutchinson & Warren, 2003; Kolletzki, 1996).

Articles dealing with resistance to adoption of Internet banking and continued use of Internet banking together appeared seven times (Curry & Penman, 2004; Durkin, Howcroft, O'Donnell, & McCartan-Quinn, 2003; Eriksson & Nilsson, 2007; Guerrero, Egea, & Gonzalez, 2007; Kuisma, Laukkanen, & Hiltunen, 2007; Mattila, Karjaluoto, & Pento, 2003; Walker & Johnson, 2005). Internet banking websites and Internet banking user profiles and demography are investigated six times (Akinci, Aksoy, & Atilgan, 2004; Berger & Gensler, 2007; Cheah, Sanmugam, & Tan, 2005; Diniz, Porto, & Adachi, 2005; Jayawardhena & Foley, 2000; Waite & Harrison, 2004). Four articles published research on Internet banking service quality (Broderick & Vachirapornpuk, 2002; Janda, Trocchia, & Gwinner, 2002; Joseph & Stone, 2003; Maenpaa, 2006; White & Nteli, 2004). The newest area of Internet banking research is Internet banking phishing attachments, with two publications 2007 (Altintas & Gursakal, 2007; Gouda, Liu, Leung, & Alam, 2007).

There is no Internet banking research which focuses on the development side of Internet banking systems, especially in the area of the Internet banking maintenance and modification phase and Internet banking systems development teams. There is an opportunity for the researcher to research and fill this gap in the Internet banking research domain. Internet banking systems need people to maintain and enhance the systems. Therefore, the performance of Internet banking systems and the effectiveness of the Internet systems development process depend on the performance of the Internet banking maintenance and modification team. An effective and efficient performance from this team will enhance the quality and speed of the Internet banking maintenance and modification process. The researcher is interested in investigating improvement of the Internet banking maintenance and modification process and the implementation of interventional change techniques for improvement of this process.

This research will add to the diversity of the Internet banking research domain by its adopting a qualitative research perspective using an action research method to create change in Internet banking systems development. The unit of analysis or sampling group is an Internet banking systems development team, which will add new knowledge to the Internet banking research domain.

As discussed earlier in introductory chapter which dealt with prior research, the majority of research papers within the Internet banking domain have studied the areas Internet banking adoption and service quality in general. There has been no study on the development of Internet banking systems development and Internet banking systems development teams. A review of the existing literature for the three associated areas of study revealed that there was no previous research into teamwork in the domain of Internet banking, process improvement, and systems development. According to the process improvement literature, there are a small number of previous research studies dealing with the teamwork concept. Nevertheless, none of these previous research papers study the area of systems development. In the systems development literature, the majority of research papers deal mainly with the usage of the three main types, and with other methods, of system development methods. The area of the system modification, enhancement, and maintenance phase of SDLC requires investigation, especially as no Internet banking research has been conducted in this area. Study of an Internet banking systems development cross-functional team is new for Internet banking domain literature. Nor has any of the existing research focused on Internet banking modification, enhancement, maintenance and development. For these reasons, the researcher believes that there is benefit in conducting this research. The research contribution will add new knowledge to the existing literature in three associated areas and to the literature on Internet banking. Therefore, there was an opportunity to extend knowledge in the Internet banking domain by investigating an effective process for Internet banking development by using intervention methodology and focusing on an interventional change process. The researcher attempted to develop a theoretical model of an effective Internet banking development process and a factor model for Internet banking adoption in the Thai organizational context. Extended knowledge of effective Internet banking development processes will assist commercial banks to create sophisticated Internet banking products and services to match customer demands.

1.4 Research questions

The central area of this study is Internet banking maintenance and modification process improvement and the main objective is to investigate how the Internet banking maintenance and modification process is improved and how interventional change techniques contribute toward process improvement.

Central research questions:

- Can interventional change techniques assist cross-functional multilevel teams to achieve Internet banking maintenance and modification process improvement, improve team performance, and increase the speed of the Internet banking maintenance and modification process?

Subresearch questions:

How do interventional change techniques support Internet banking maintenance and modification process improvement?

- How well does departmental participation technique support Internet banking maintenance and modification process improvement? Why, or why not, does the technique work? (Departmental participation: Technique no. 1)
- How well does an equal participation technique support Internet banking maintenance and modification process improvement? Why, or why not, does the technique work? (Equal participation: Technique no. 2)
- How well does a holistic scenario technique support Internet banking maintenance and modification process improvement? Why, or why not, does the technique work? (Holistic scenario: Technique no. 3)
- How well does management support technique support Internet banking maintenance and modification process improvement? Why, or why not, does the technique work? (Management support: Technique no. 4)

1.5 Research methods

The main objective for this research is to create change in the Internet banking maintenance and modification process which aims for process improvement by utilizing interventional change techniques. This research required a high level of involvement and research intervention on the part of the researcher. The subject of study and the researcher are inseparable. The researcher needs to work closely with the Internet banking maintenance and modification team as one of the team members, an observer, and a facilitator.

To achieve this end, the researcher decided to utilize a qualitative research approach and adopt action research as the research methodology in order to achieve change and improvement for the Internet banking maintenance and modification process.

1.5.1 Qualitative research

There is high involvement and influence from the researcher within this study. The context of the study is an actual business situation which could not be controlled by the researcher and research partner, so, there is no control experiment within this research. The context of research is associated with the current situation of the Internet banking maintenance and modification process. While the Internet banking maintenance and modification team was attempting to solve the existing problems and enhance the service quality of Internet banking systems, the researcher was attempting to change and improve the process. During the research process, the researcher participated in, observed, and then interpreted the research outcomes of Internet banking maintenance and modification process improvement.

1.5.2 Action research

The researcher decided to adopt action research as the research methodology because action research is the process that contributes change by implementing positive intervention in client organizations. Lewin (1946), Jonsson (1990), and Kock and McQueen (1997b) applied positive intervention change to their client organizations and collected data regarding the effects of intervention. These earlier studies show evidence and provide solid support for the adoption of action research in this study. Change in the Internet banking maintenance and modification process is the priority for this research. One possible option to create change is research intervention and implementation of positive interventional change techniques. The four interventional change techniques were introduced and implemented during the single action research cyclic process. The consequences of interventional change techniques were analysed and will be presented.

1.5.3 Data gathering

Data were collected for the Internet banking maintenance and modification team of Bank of Asia Public Company Limited which was then a member of United Overseas Bank (UOB). There was a change of business partner and takeover by UOB Thai in 2005. United Overseas Bank (Thai) Public Company Limited (UOB Thai) was set to bring financial services to new heights for their customers in Thailand. With 154 branches and over 300 ATMs nationwide, UOB offers both consumer and corporate banking customers a wide array of products and services ranging from personal financial services to institutional banking, investment banking and treasury services. UOB is the eighth largest commercial bank in Thailand, with total assets of THB206 billion as at 31 March, 2006.

Internet banking maintenance and modification team members come from all related departments involved in the Internet banking maintenance and modification process. The team members all participated and were involved in the process improvement project. At the end of the action research process improvement project, the researcher conducted semi-structured interviews in order to reflect on the process improvement and the effects of the intervention change techniques.

1.5.4 Data analysis

For data analysis, the researcher decided to adopt the traditional way and simplified version of qualitative data analysis by using grounded theory action research (Robertson, 1995). Grounded theory action research allows themes to emerge from raw data. There is a hierarchy of data which emerges from raw data to category of data. The lowest level of data is raw data from transcribed interviews. The research proposition or incidents are identified as the second level of data analysis. The research propositions are then analyzed and categorized into the higher level of data analysis process -- the themes level. The highest level of the data analysis of this process is the category level. At the end of the data analysis process, the researcher will explain the phenomena that existed during the action research process by using a set of causal links. The causal relationship between the four interventional change techniques and the effects of thee techniques implemented will be identified and

presented in the form of causal relationship diagrams. The model of Internet banking maintenance and modification process improvement will be identified.

1.6 Thesis overview

This thesis comprises seven chapters. Chapter 1 has presented the motivation for this research and background knowledge on the Internet banking research domain. The research questions and research methodology were briefly described. Chapter 2 contains a review of the literature on teamwork, process improvement, and systems development. In this chapter, the researcher describes the foundation of three literature areas. The main literature focus in the teamwork literature covers differences in cross-functional teams, team effectiveness, conflict in teams, barriers of teamwork, enabling factors for teamwork, and the relationship between teamwork and process improvement. Process improvement literature is divided into three main parts The section begins by asking what process improvement, process improvement driven by noninformation technology, and process improvement driven by information technology are. The final part of this chapter reviews the systems development process by covering the three main systems development methods. The systems development literature focuses on the system modification, enhancement, and maintenance phase or the post-implementation of systems development process. Chapter 3 discusses the fundamentals of research paradigms and theoretical perspectives and the justification for the chosen research method is identified. Action research is adopted as the research method and the research framework. Unit of analysis, data collection, and data analysis are discussed. Chapter 3 provides theoretical knowledge about research validity, reliability, and trustworthiness of qualitative research. Chapter 4 explains the data gathering and data analysis. Full explanation of the data gathering plan includes approaching the research partner, action research introduction, action research preparation, and the action research process for Internet banking systems maintenance and modification phase process improvement. The data analysis section provides data analysis procedures which include data management, data analysis, and data display. Chapter 5 presents all the research findings based on the data analysis using applied grounded theory. The effects of the four interventional change techniques will be presented. Data from the reflective semistructured interviews will be analyzed and presented in the hierarchy of

data from the lowest level (raw data) to highest level (categories). The raw data will be analyzed and grounded from raw data, incidents, research propositions, research themes, and research categories. Chapter 6 presents and discusses each technique in greater detail and the effectiveness and impact of techniques on the Internet banking maintenance and modification process improvement. At the end of each discussion section, the causal relationship diagrams are presented and established. Chapter 7 provides a summary of research contributions for both organizations and academia, research implications for practitioners and academic researchers, research limitations, and opportunities for further research.

1.7 Summary

This chapter has presented the thesis overview which includes research motivation, research opportunity, research method, and thesis outline. The research motivation explains the reason for the researcher's interest in this topic. Within the research motivation background information from within the research domain is also provided in order to identify the research opportunity. The research questions are presented with the brief plan of how this research was to be conducted. The final part of this chapter is a summary of thesis structure. The next chapter is a literature review which covers the three overlapping areas of this study.

Chapter 2 Literature Review

This chapter provides background information regarding the existing literature in the three associated areas of the study. The three areas of this study are teamwork, process improvement, and systems development. This chapter begins by associating the three areas of study. It then presents the literature on teamwork which focuses on cross-functional teams and team effectiveness or team performance. The next area of study is process improvement. Within this area, the researcher explains the two different kinds of process improvement: IT-driven process improvement and nonIT-driven process improvement. The final associated area is systems development literature. Within this area, the researcher generally describes the main forms of systems development process and then narrows more specifically to the area of post-implementation of systems development.

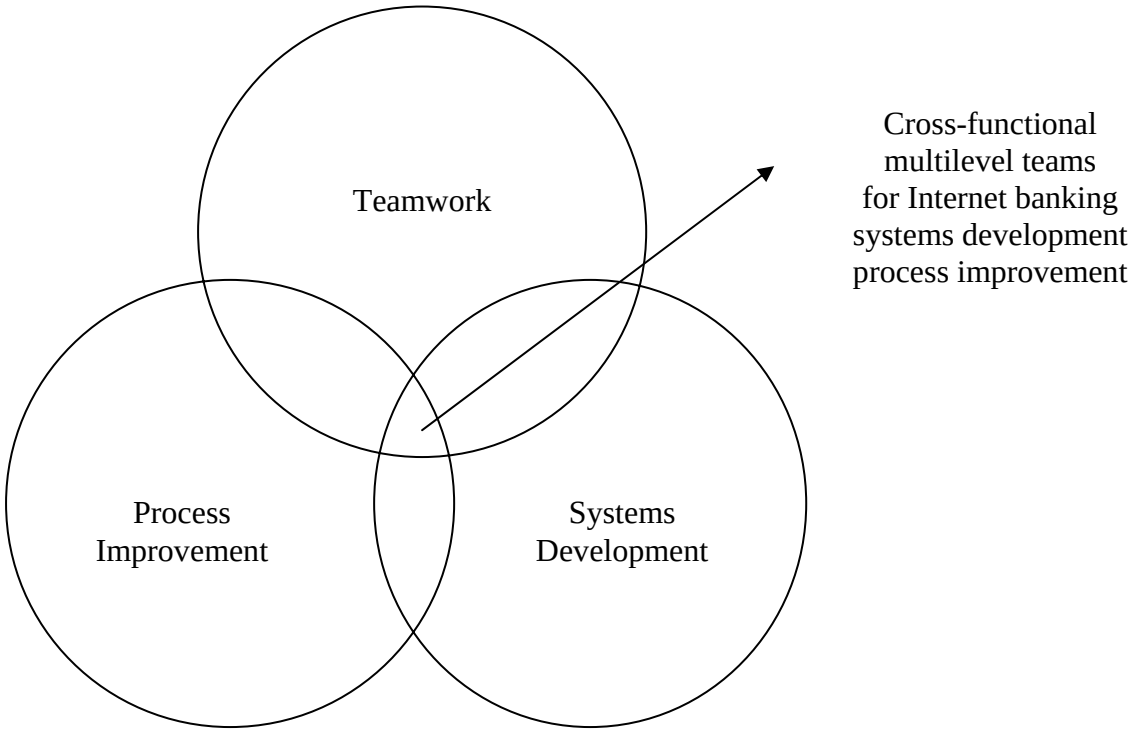
2.1 Overlapping areas of study

The main objective for this research is to investigate the process improvement of Internet banking maintenance and modification process improvement (IBMMPI). The researcher attempts to introduce four interventional change techniques via a cross-functional multilevel team (CFMLT). This study focuses on the impact of this team on process improvement in the Internet banking maintenance and modification phase. Internet banking is the research domain. Teamwork, process improvement and systems development are the three associated areas of the study. To investigate these three areas, the associated literature needed to be reviewed. The three areas of the study are depicted in Figure 2.1.

The first area of the study is teamwork. Teamwork literature for this research covers several subtopics such as the general definition of teamwork, difference between a group and a team, cross-functional team, team effectiveness, barriers to teamwork, and enabling factors for team effectiveness. The second area is process improvement. Process improvement literature presents three subtopics: the meaning of process improvement, IT-driven process improvement and nonIT-driven process improvement. The final area of the study is systems development. Systems

development literature relevant to this research includes reasons why organizations develop information systems (IS). Three well-known systems development methods will be presented: the traditional systems development lifecycle (SDLC); the waterfall model; and rapid application development (RAD). Systems modification and the maintenance process of SDLC are targeted as specific areas of importance for the present study.

Figure 2.1:
Three overlapping areas of study



2.2 Teamwork

The improvement of team productivity is one of the most challenging tasks for organizations to achieve (Varney, 1990). Drew and Coulson-Thomas (1996) stated that teamwork is one of the most recommended tools for organizational transformation. Efficient teamwork had been shown to be a key element for business process and performance improvement which promoted organizational performance (Telleria, Little, & MacBryde, 2002). Teams had become significantly and increasingly popular in firms of all sizes and industries (Hartenian, 2003). The team

was one of the most noticeable forms of a new way of problem-solving, fostering quality and productivity, and, in some cases, managing entire operations (Proehl, 1997). Tanskanen, Buhanist, and Kostama (1998) reported that teamwork proved to be self-evident to solve all kinds of problems both in the academic field and in organizations. Managers and consultants attempted to introduce the teamwork concept to all kinds of businesses, regardless of the nature of operational process and production. The use of the teamwork concept became one of the criteria for organizational success factors right throughout the late 1990s (Appelbaum, Abdallah, & Shapiro, 1999).

Organizations created teams in order to improve their processes and increase competitive advantage. Teams generated benefits for organizations by improving productivity, enhancing creativity, reducing response times, and improving decision-making. In addition, teams were used to improve communication among interdependent individuals and to take advantage of multiple perspectives in problem-solving situations (Hartenian, 2003). Elmuti (1997) found that team-based management improved participant productivity, quality, satisfaction, performance, and appeared to be effective. He also pointed out that the involvement in team-based management was positively related to change in satisfaction with an opportunity to participate, accomplish something worthwhile at work, and enhance needed skills for career advancement. In addition, team-based management also was positively related to perceived change in communication, job meaningfulness, challenge, productivity, quality and performance among employees.

Self-directed teams, cross-functional teams, and continuous improvement teams were being used as the way to achieve employee participation as well as keep in touch with customers. These teamwork concepts sometimes were called semi-autonomous work teams or self-managing teams (Piczac & Hauser, 1996).

2.2.1 Teams and groups what are the differences?

"Team" is defined by Salas, Dickinson, Converse, and Tannenbaum (1992) as a "distinguishable set of two or more people who interact dynamically, interdependently, and adaptively toward a common and valued goal

/objective/mission, who have each been assigned specific roles or functions to perform, and who have a limited life-span membership" (Salas, Dickinson, Converse, & Tannenbaum, 1992, p.4). Natale, Libertella, and Rothschild (1995) note a team as being "defined by a small number of individuals with complementary skills holding themselves mutually accountable for a commitment to quality, customer services, and productivity"(Natale, Libertella, & Rothschild, 1995, p.7). A team-orientation approach to managing both dynamic and progressive performance yielded organizational benefits such as increased performance, improved quality, enhanced level of job satisfaction, and it released and utilized the powerful creativity of people in organizations (Varney, 1990). Teamwork had two kinds of objectives: co-coordination and innovation (Nurmi, 1996). Hadyn (1996) described the characteristics of teamworking as being that teamworking was a disciplined and focused way of working which had the following characteristics:

- Relationship: teams worked through face-to-face relationships between people in specifically formed teams;
- Social: people liked to gather together in teams and represent units of social interaction and potential sources of satisfaction at work; and
- Purposive: team members interacted with each other for the purpose of performing toward a common goal (p. 8).

Teams and groups are slightly different yet some people use these terms interchangeably. Stewart, Manz, and Sims (1999) defined the difference between these two terms as follows; a group generally consisted of two or more who interacted in some way, while team usually was a group of people who shared commitments and goals. Therefore, a team was a collective group of people, who existed and were part of the larger system or organization, who identified themselves as team members, who were independent, who performed tasks that affected other individuals or groups in organization. Katzenbach and Smith (1993) defined team as "a small number of people with complementary skills who are committed to a common purpose, performance goals, and approach for which they hold themselves mutually accountable" (Katzenbach & Smith, 1993, p.45).

Williams (1996) distinguished the difference between teams and groups by using their level of dependency and the degree of commonality. For low dependency working groups, the work of individual members was not dependent on the success of other members so the group did not need to work together as a team. In contrast, in the situation of high dependency, the work of one individual member was totally interlinked with the work of other members. Team members could not achieve their target unless the other members achieved theirs. The other factor was degree of commonality which referred to the team's goal as being greater than the individual's goal. Groups and teams also were different in terms of expectations, communications, process, and intimacy. Expectations were seen to play a significant role within teams. Team members expected high involvement, commitment, cooperation, and support. A true team required a high level and high quality level of these from team members. It was also legitimate for team members to expect to give and take from other team members. Communication was needed within the team concept because they needed to communicate in order to ensure that team members worked effectively together. Teams needed more a sophisticated communication structure than groups did because teams needed to exchange information, make decisions, develop openness, and build relationships among team members. Process needed to be focused on, because process was the way that team members worked together and managed their relationships. They needed to work well together and teams had a high level of dependency. Intimacy is defined as how well team members know each other and how open they need to be with each other. There was high level of openness and discourse, as well as more dependence on each other within teams (Williams, 1996, p. 15-19).

2.2.2 Teamwork in organizations

A functional perspective provided the simplest rationale for establishing a team. This perspective argued that people join teams because a team was able to accomplish things or work that individuals are not able to accomplish when working alone. A further explanation was that the an individual joined a team because a team made effort more efficient, and assisted individuals to complete common tasks more quickly and effectively (Stewart, Manz, & Sims, 1999, p. 4-5). From an organizational point of view, a team existed because organizations achieved efficient production and individuals joined a team because this gave them opportunities to produce more

products and services which led to higher wages. The team also provided some intrinsic benefits in terms of social rewards such as friendship, self-esteem, and a feeling of control (Stewart, Manz, & Sims, 1999, p.9). Mudambi, Mudambi, and Navarra (2007) found that teamwork had significant positive effects on knowledge output in foreign R&D subsidiaries, because teamwork was defined as the cooperative networking and communication between or within subsidiaries or units of a firm.

The team approach has been accepted and adopted by many well-known organizations, for example, Procter and Gamble, since the 1960s. Procter and Gamble viewed and treated teamwork as the company's significant competitive advantage. Through the 1970s and 1980s, many US-based companies started to pay attention and adopted teamwork; for example, General Motors, Ford, Chrysler, Motorola, General Electric, Caterpillar, Boeing, AT&T, and Xerox (Stewart, Manz, & Sims, 1999, p. 8). There were some driving forces for shifting to teamwork; one of the most common reasons was improving productivity and quality. Teams were perceived as the way to undertake continuous improvement while increasing productivity. The other reason was that teams reduced conflict between management and labor. The most frequently cited benefits from teamwork were increased productivity, improved quality, enhanced employee quality of work life, reduced cost, reduced turnover and absenteeism, reduced conflict, increased innovation, and better organizational adaptability and flexibility (Stewart, Manz, & Sims, 1999, p. 11). In a health care unit which adopted teamwork, Solheim, McElmurry, and Kim (2007) found that team practice was valued in the health care unit because health issues were complex and required different types of expertise, and teamwork fostered comprehensive care and improved resource usage.

Teamwork was one of the common techniques used to cope with or achieve change. Cross-functional teams and collaboration were recognized and trumpeted as having benefits and facilitating improvement. Drew and Coulson-Thomas (1996) presented the typical teamwork benefits as breaking down boundaries to effective communication and collaboration; increasing the speed of actions; raising the level of commitment; creating a more customer-focused culture; and increasing organizational adaptability and flexibility. Telleria, Little, and MacBryde (2002) found that efficient teamwork was a key element for improving business process and, as a result,

increasing organizational performance. The authors conducted case study research on a Spanish luxury coach builder and implemented a teamwork concept. They found the organization gained a high level of competitiveness through improved business processes and teams. The new management team attempted to create and preserve employees' commitment. The researchers found that to gain 100% commitment from employees, there were Four main elements had made the management model extremely successful – gaining 100% commitment from employees -- and turned around an organization in crisis to produce a successful organization (Proehl, 1997, p. 137).

2.2.3 Cross-functional teams

Cross-functionality is defined as the degree to which team members differ in their functional backgrounds, knowledge backgrounds, and experiential backgrounds (Gebert, Boerner, & Kearney, 2006). A cross-functional team is a team of people with complementary skills who have been chosen to achieve a common goal and are mutually accountable for the team success (Katzenbach & Smith, 1993). The team could be permanent or temporary (Wellins, Byham, & Dixon, 1994). Cross-functional teams consist of members representing various departments or functions. Every month, members of cross-functional teams met with other counterparts for coordinating, developing plans, decision-making, and team meetings. The temporary cross-functional team is established for special projects, for example, planning new performance evaluation systems and solving key customer problems. In some cases, this team is assigned to improve major organizational processes or develop new products. Wellins, Byham, and Dixon (1994) found most cross-functional teams were highly self-directed, have their own agenda and take responsibility for actions. Bishop (1999) agreed that cross-functional teams were popular for change orientation projects, for example, introduction of total quality, business process reengineering, and improvement of products and service quality. Cross-functional teams have increased their popularity and are used in various contexts. The areas for which cross-functional teams were regularly implemented cover these areas: new product development (NPD) (Fredericks, 2005; Garrett, Buisson, & Yap, 2006; Gerwin, 1999; Jeong, Pae, & Zhou, 2006; McDonoughill, 2000; Song, Montoya-Weiss, & Schmidt, 1997; Song & Noh, 2006; Song & Thieme, 2006; Todd, Kumar, & Kumar,

2005); reengineering organizational processes (Bolet, 1994; Davis, 1993; Kumar & Strehlow, 2004); and improving organizational performance (Bamber, Castka, Sharp, & Motara, 2003; Mohamed, Stankosky, & Murray, 2004).

2.2.3.1 Cross-functional teams in organizations

One well-known approach taken by successful organizations is the shift from individuals to cross-functional teams (Rangarajan, Chonko, Jones, & Roberts, 2004). Cross-functional teams attempted to solve organizational problems by establishing organizational connections across functional silos. Cross-functional teams played a significant role in connecting organization units and providing a superlative medium for competence gains and productivity enhancement (Mohamed, Stankosky, & Murray, 2004). Mohamed et al. (2004) said that "traditional organizational structure had internal competition, rigid functional silos, and undue compartmentalization exhibiting sub-optimal performance by inhibiting critical knowledge flows" (Mohamed, Stankosky, & Murray, 2004, p.127).

Webber (Webber, 2002) posited that organizations moving into the twenty-first century were confronted with work challenges and there was an increasing need for cross-functional teams. It was also important that organizations needed to understand and to exploit the maximum benefits from cross-functional teams.

Hammer and Champy (1993) believed that customers in a competitive business environment demanded higher value than did customers in a traditional business environment. The cross-functional teams had reported achieving increased customer value by achieving reductions in time and cost of product development and increases in the quality of new products (Cordero, 1991). Gerwin (1999) added that the cross-functional team was a powerful team-based organization that swept through North American business firms, supplanting functional specialization and comprehensive managerial control. Cross-functional teams included important stakeholders and the teams coordinated their own activities. Team members were in the best position to make many business and technical decisions.

Proleh (1997) reviewed a body of literature and found that seven factors were most frequently cited for building effective teams: a strong and compelling performance challenge for the team; clear goals and objectives which were understood by all members; participative leadership where members were encouraged to share the leadership function; good communication with a high level of trust, honesty, and respect for others; willingness to deal with conflict, and comfort with challenge and disagreements; good co-ordination and organization so that talents of members were effectively tapped; and consensual decision-making based on facts, data and logic. Cross-functional teams were increasingly used in organizations to develop new products, re-engineer organizational processes, improve customer relationships, and improve organizational performance. In addition, Proleh found five factors were repeatedly cited as contributing to cross-functional team success. These five factors were: membership had functional representation, open-minded, highly motivated members, and representation from the end users; a skilled leader in a position of authority; both authority and accountability to accomplish its tasks; availability of adequate management support and resources; and provision of adequate internal and external communication systems.

Proleh found that when participants came from different functional areas, the team became a multicultural experience because members had different perspectives, vocabularies, and behaviors. Members also established a culture of respect, open communication, and mutuality. The leader's role was absolutely critical because leaders needed to maintain the commitment, perspective, and enthusiasm of members. The author also emphasized that the cross-functional team needed both authority and accountability. Management support and adequate resources were significant factors for cross-functional team success. Organizational support and resources were needed in order to ensure team success. Support included offering work time or release time for members to work on a cross-functional team, holding immediate supervisors accountable for active participants for their reports, and providing budgetary and other support to teams.

Bamber, Castka, Sharp, and Motara (2003) conducted case study research on a cross-functional teamworking for overall equipment effectiveness. The research showed that the implementation of cross-functional teams effectively addressed all the six

majorlosses and improved overall equipment performance. They indicated that cross-functional teams brought together all the necessary skills and knowledge of the entire system of manufacture in order to correctly identify the practices and activities that related to the losses. Furthermore, the cross-functional teams also provided an opportunity to address immediately identified improvement and ensure that action plans were developed during the team meeting. In addition, the use of cross-functional teams guaranteed the best utilization of operational and other resources by using the authority and responsibility of team members who represented various departments and functions within organizations.

There are a number of reasons for an organization to adopt cross-functional teams. Huang and Newell (2003) noted that organizations adopted cross-functional teams because these enabled an organization to gather a wide range of expertise from various units to accomplish complicated tasks which were not easily done by one unit. Cross-functional teams obtained sufficient help from all stakeholders who represented various units because having organization-wide representatives created a collective sense of belongingness which reduced the conflict between departments, enhanced the quality of decision-making by having multiple perspectives, and the integration of differentiated knowledge directly promoted team effectiveness. It also generally promoted operational process enhancements in efficiency and effectiveness by minimizing multitask lead-time and redundancies (Proehl, 1996; Webber, 2002). Cordero, Farris, and DiTomaso (1998) found that the implementation of a cross-functional team created positive job outcomes in terms of job growth, job security, membership in successful teams, earning money, and job satisfaction. Therefore, working on cross-functional teams was shown to enhance the quality of work life.

2.2.3.2 The characteristics and responsibilities

A cross-functional team is characteristically a team of employees who come from different departments and work as a team to coordinate a complex project or to resolve a problem that affects each of their areas. Huang and Newell (2003) presented the three distinctive characteristics of cross-functional teams. First, cross-functional teams basically focus on creativity and innovation; team members are invited to generate new ideas or solutions that did not previously exist in the organization.

Secondly, cross-functional teams usually achieve consensus through the collective input, investigation, and negotiation of team members. Lastly, they are used for managing strategic change initiatives (McDonoughill, (2000).

2.2.3.3 Positive and negative aspects of cross-functional teams:

Positive aspects

Basically, organizations adopt a functional structure which focuses on developing in-depth skill specialization of staff members. However, this functional structure creates some problems such as slow organizational response to external departments because communication across departments takes time and effort. Implementing cross-functional teams is one solution for an organization to become more flexible and responsive without dismantling the existing functional structure (McGinnis & Kemp, 1998, p.297). Moreover, implementing cross-functional teams offers some major advantages; for example, communication between departments is facilitated, organizational knowledge and skills are strengthened and expanded, team members learn more about each other's work and the whole organizational operation, and team members have an opportunity to build planning, negotiating, and communication skills (McGinnis & Kemp, 1998, p. 299).

One empirical research study showed that cross-functional teams were more effective than traditional or compulsory members, because team members were motivated to work toward their goals and had a clearer understanding about their operational process. Team members also posited that working together contributed a greater result than the combination of their individual efforts. The organization also achieved a reduction of product development cycle on Varian projects of up to 50% (Sohal, Terziovski, & Zutshi (2003). In addition, both research and practice demonstrated that organizations that invested in improving organizational development through a cross-functional team performed better than organizations that invested purely in tools and technologies because the cross-functional team improved and developed social mechanisms which facilitated and encouraged a collaborative environment (Haque, Pawar, & Barson, 2003).

The findings of Attaran and Nguyen (1999b) showed that there was a significant change in organizational culture from an unstructured, individualistic, throw-it-over-the-wall attitude to problem-solving and decision-making, to a predominantly participative problem-solving and decision-making culture, following the initiation of cross-functional teamwork. Song and Thieme (2006) found that the implementation of a cross-functional team minimized the information gap, and highlighted the importance of information sharing between the R&D and marketing departments as the way to reduce uncertainty in the highly volatile environment of new product development. In addition, cross-functional teamwork also minimized the participation gap, which assisted marketing involvement in traditional R&D activities. The minimization of the information gap was achieved by the harmonious relationship between R&D and marketing, and the supportive environment for participation in decision-making. The better relationship when departments worked together created more marketing involvement in traditional R&D activities. These factors contributed to success of new product development.

Negative aspects

Jasswalla and Sashittal (1999) stated that in a cross-functional teamworking environment, there were possibilities for unshared and sometimes conflicting goals and perceived differences in professional allegiance. Even though team members shared project goals, team members from different departments or functions tended to have different functional objectives, priorities, and agendas. McGinnis and Kemp (1998) also found that cross-functional teams were faced with potential disadvantages; for example, when team members experienced conflicts and dual loyalties when their department and team had conflicts in demands. The other potential problem was a team focus on a decision that benefited their team rather than the organization as a whole. Gebert, Boerner, and Kearney (2006) noted that the cross-functional team had to deal with relationship conflict, value conflict, and task conflict which led to subgroup formation and might prevent team members from presenting and expressing their individuality, which caused communication barriers. Barczak and Wilemon (2005) suggested that sometimes team members were unclear about how they were evaluated and/or rewarded for their performance. Team members could be evaluated based on their individual work or the outcome of the

project. In addition, they had expertise and knowledge to perform functional work but sometimes lacked interpersonal skills like communication skills, negotiation skills, and team building skills which could make them effective team members.

2.2.4 Team effectiveness

Team performance is characterized by the two components: efficiency and effectiveness. These terms are different, although they are often confused. Drucker (1977) defined the difference between the two concepts as efficiency being focused on doing things right, while effectiveness focused on doing the right things. Johnson and Scholes (1989) defined efficiency as a measurement of how well resources had been utilized, while effectiveness was the ability to harmonize the capability within the external environment. Hackman (1990) provided more decisive definition of team effectiveness as the degree to which a team's outputs met the requirements in terms of quantity, quality, and timely performance. Hackman's definition focused on the team's effectiveness in the sense of the functions of performance, attitude, and behavior. The team experience improved its members' ability to work as a team and contributed to members' satisfaction.

Katzenbach and Smith (1993) stated that team performance was a product of process and people. They suggested that effective team performance depended on the following factors: establishing an early sense of urgency and direction; carefully selecting team members on the basis of personality and skills; making a good start because first impression is important; setting the ground rules for conduct and behavior; forming an agreement on goals and quantifiable measurements for team performance; meeting regularly for creating a comfortable feeling among team members; and utilizing positive feedback to recognize and reinforce individual participation.

They also summarized the characteristics of superior-performing teams based on team size, members' skills, purpose and goals, work relationships, and accountability. The authors proposed that the optimal team size was fewer than 10 members, but the most successful teams had between 2 and 25 members. In general, performance tended to

increase with size by having the added knowledge of additional team members. However, the point beyond the optimal size decreased team performance because sub-teams developed and had potential decision-making and interaction problems. In contrast, in a small team of people, it was found to be easier to overcome personal, social and political differences toward common goals. Teams needed various skills within them. In essence, they became more productive when team members had different skills and attributes. Individual members had opportunities to develop and increase their technical or functional expertise, problem-solving and decision-making skills, and interpersonal skills. The immediate goals needed to coincide with the overall purpose and the short-term goals needed to match with long-term strategies. The working relationships between team members needed to be fair and equal. The workload and responsibility needed to be divided equally in order to achieve team goals and satisfy team members. The sincere promises of commitment and trust created and developed collective accountability among team members. Anderson, Hardy, and West (1990) suggested that to achieve team innovation and creativity, a team needed to implement three practical techniques. The first was a mission statement negotiated with team consensus to combine and articulate team members' personal beliefs. Members determined the team's direction and had clear direction. The second was the availability of support and information, with the team leader and members sharing information and supporting individual team members to achieve their task. The third technique was a climate for excellence as the driver for excellence and achievement of team members.

There is a link between team and performance responsibility (Twomey & Kleiner, (1996). Team members need to be committed to performance goals. A small number of team members encourage them all to feel a sense of responsibility. Team members also need to have complementary skills, which is the most difficult aspect to manage for teamwork. It is hard to develop and gather the right mix of skills among the team members. Twomey and Kleiner also found that not only was the right mix of skills required, teamwork also needed clear goals, upper management support, challenges, rules, and commitment.

2.2.4.1 Team effectiveness: measurement

A framework for measurement of effective teamwork was proposed by Adams, Simon, and Ruiz-Ulloa (2002). They developed this framework of seven constructs. The first construct is productive conflict resolution. These are the processes or actions to facilitate the solution of conflicts and problems, increase cohesiveness of team members, explore alternative positions, increase team involvement, and enhance the decision-making process. The second is mature communication which refers to the ability of team members to articulate decisive ideas, provide rationale for their ideas, listen to other team members without interruption, and provide constructive feedback. Accountable interdependence is another important construct involving the mutual dependence of team members on the quality and quantity of individual team members. Clearly defined goals need to be understood by all team members and goals need to be attached to specific team objectives, and team members are expected to participate in and commit to these. A common purpose is the team's major objective and the reason for its establishment. There needs to be role clarity with the team members understanding their role and expectations in their tasks. Psychological safety is the last construct, which refers to the shared belief of no interpersonal risk-taking. This construct means that all members have confidence to express their ideas without being attacked, and is based on a sense of trust and respect for each other. Ruiz-Ulloa and Adams (2004) adopted Adams et al.'s (2002) framework for their study and found that there was a positive relationship between the characteristics of effective teamwork and the attitude toward teamwork. The research found that when students developed and showed their development of mature communication, accountability interdependence, psychological safety, common purpose, and clear understanding, their characteristics promoted and contributed a better attitude toward working in a team. The team attitude promoted team effectiveness. Kim, Chang, and Heo (2006) proposed the team crystallization model which was a holistic approach for evaluating team effectiveness. The model comprised four elements: state, information, organization, and orientation. The authors argued that this model provided a systematic measurement to evaluate time-dependent team effectiveness.

In addition, Stewart et al. (1999) stated that team effectiveness could be measured by using multidimensional perspectives. They believed that the multidimensional

perspectives indicated that team effectiveness could be measured by the products and services that team produced, the ability of the team to remain intact, and the extent to which team members were satisfied with each other.

Wheelan (1999) proposed a high-performance team effectiveness which included three variables with a 25 item survey instrument in order to determine levels of team effectiveness. The three variables and the 25 items are summarized in Table 2.1.

Table 2.1:

Summary of team effectiveness

Problem-solving and relationships	**Roles and Goals**	**Feed back and structure**
Time to define problems	Clear about team goals	Members received regular feedback
Planning how to solve the problems	Agree on team goals	Members give each other feedback
Effective decision-making strategies	Task requirement to work together	Members use feedback to make improvements
Implementing solutions	Clear about roles	Members set norms to encourage innovation
Methods for evaluating solution	Accept their roles	Sub-teams are integrated into team
Accepting member's behavior	Assignment matches abilities;	Teams are small in size
Team norms to encourage performance	Open communication	
Time for accomplishing goals		
Cohesiveness and cooperation		
Effective conflict management		

Source: Wheelan, (1999)

The team-based performance measurement system (TPMS) was proposed and tested by Mendibil and MacBryde (2006). TPMS comprised nine stages: identify company strategy and organizational performance measures; identify team stakeholders' requirements; define team strategy and goals; develop top-level performance measures; identify key drivers of team performance and define improvement initiatives; develop performance measures for key drivers; define measurement

strategy; refine and agree performance measure; and define the TPMS review mechanism. The authors confirmed that the data gathered demonstrated the novelty and validity of the construct in the TPMS model (Mendibil & MacBryde, 2006, p.217-218). Senior and Swailes (2007) developed and tested the Teamwork Survey (TWS) which combined 75 items of construct cluster. The authors suggested that TWS was not just a measurement tool; it was also a potential diagnostic instrument that could assist team members and the team leader to understand how to improve and achieve high team performance.

2.2.4.2 Team effectiveness: Key success factors

There were several key elements to determine team effectiveness. Varney (1990) presented the generic guidelines for team effectiveness. These were communication, objectives, interpersonal conflict, controls, support, roles of team members, decision-making, and results (Varney, 1990, p. 22-23). A team had ineffective productivity when there is cautious or guarded communication, formal or structural communication, failure to share information, reliance on criticism, unclear goals and unrealistic goals, low commitment, tension within the team, misunderstanding of jobs or roles, low confidence in others, and one-person decision-making (Varney, 1990, p. 14-18). Clear and accurate problem identification was a key fundamental to improving teamwork. The comprehensive definition of team problems required team members' contributions because they were the people who were able to articulate and clarify information and problems through their work experience. Therefore, the involvement of team members directly improved team effectiveness (Varney, 1990, p.43-44). Once the problems had been identified, team members needed to define their task and maintenance responsibilities. Task responsibility was the tasks that team members needed to complete in order to sustain the direction of a specific task. Maintenance responsibility was the ability of team member to encourage, praise, and agree with the contributions of others. These maintenance responsibilities created harmonious working relationships (Varney, 1990, p. 55-57).

Team leadership, mutual performance monitoring, back-up behavior, adaptability, and team orientation were found and proposed as the "Big Five" of teamwork by Salas, Sims, and Burke (2005). Rasmussen and Jeppesen (2006) reviewed 55 articles published between 2000 and 2005 and found that psychological variables such as

commitment, cohesion, and satisfaction had positive association with teamwork, whereas belief about failure and different values were found to have negative association with teamwork. In addition, team autonomy and team interdependence played an important role for psychological factors associated with teamwork. Hoegl and Parboteeah (2007) investigated the influence of teamwork quality on the team performance and the effect of domain-relevant skills and creative-thinking skills in an innovation team. A surprise result showed that neither domain-relevant skills nor creative-thinking skills had a direct effect on team effectiveness. Instead, teamwork quality had positive effects on the relationship between creative-thinking skills, team efficacy, and team effectiveness. Teamwork quality included communication, coordination, balance of member contribution, mutual support, effort, and cohesion.

El-Kot and Leat (2005) gathered factors perceived by Western researchers as influential in determining team effectiveness and tested these in an Egyptian organizational context. The authors found that a suitable culture for teamwork, team members' satisfaction, clear team goals and team vision, and team responsibility to make decisions were influential in determining key success factors for team effectiveness. Campany, Dubinsky, Druskat, Mangino, and Flynn (2007) added that team effectiveness needed team performance measurement and clear support or consistent executive support. Yauch (2007) proposed team attributes necessary to facilitate agile manufacturing, which included multifunctional teams, dynamic teams, cooperative teams, and virtual teams. Therefore, teams operating within the context of agile manufacturing were characterized as multifunctional, dynamic, cooperative, and virtual teams.

Child and Shumate (2007) investigated whether the intranet-based repository use and perception of accurate team knowledge of who knows what were related to perceived team effectiveness. The research findings showed that the repository use was not positively related the perceived team effectiveness, whereas the perception of an accurate who-knows-what knowledge was positive to team effectiveness. Burke et al. (2006) researched the relationship between leadership behaviors and team performance, and found that the use of task-focused behaviors was moderately related to perceived team effectiveness and team productivity. Person-focused behaviors were

related to perceived team effectiveness, team productivity, and team performance outcomes.

The critical team member dispositional assertiveness was found to have a positive effect on team performance and team satisfaction because those effects were due to improvement in a team's transactive memory systems (Pearsall & Ellis, 2006). Stewart (2006) argued that individual ability and disposition correlated positively with team performance. Increased autonomy and intrateam coordination related to high performance; however, it depended on task type. Drach-Zahavy and Freund (2007) attempted to discover whether working under stressful circumstances restricted or enhanced team effectiveness. The research showed that mechanistic structuring for teams working under quantitative stress was positively associated with team commitment, which in turn fostered team effectiveness, whereas organic structuring for working under quantitative stress improved team effectiveness. This finding implied that the team performed effectively under stress, and commitment mediated the relationship between stress, structuring, and team effectiveness.

De Dreu (2007) and Gurtner, Tschan, Semmer, and Nagele (2007) agreed that effects of reflexivity had a positive effect on team process and performance. De Dreu (2007) found that when team members perceived cooperative outcome interdependence, they shared better information and they learnt more effectively. Gurtner et al. (2007) suggested that individual reflexivity was superior to group reflexivity because group reflexivity decreased the commander's active behavior and increased discussion of strategies which were too general to be helpful.

Myers-Briggs personality dimensions were adopted and used as a psychological type for team effectiveness. The research findings showed no significant correlation between psychological type dimensions and team effectiveness. However, the authors proposed that the training of the type of personality of team members helped teams to improve communication, trust, and interdependence, which was essential for team effectiveness (Varvel, Adams, Pridie, & Ruiz Ulloa, 2004).

James, Goodwin, Salas and O'Shea (2006) studied the relationship between team member personalities and team effectiveness. The authors developed and proposed a

hierarchical model of team member personality which defined the higher level of personality traits relevant to team performance. Kang, Yang, and Rowley (2006) investigated team members' characteristics, particularly cognitive and demographic, on team effectiveness. The research findings showed that team effectiveness was more influenced by cognitive similarities than demographic similarities. Bell (2007) studied deep-level team composition, such as personality, values, and abilities in team performance. The results showed that team minimum agreeableness and team mean conscientiousness, openness to experience, collectivism, and preference for teamwork had strong predictability power on team performance.

2.2.4 Barriers to and challenges of teamwork

2.2.4.1 Barriers to teamwork

The well accepted and recognised barriers to effective teamwork were lack of sufficient senior management support and commitment; lack of clear vision, goals, and objectives; insufficient release time from other duties for team members; failure to recognize and reward team effort; inadequate training and skills development; unwillingness to allow teams necessary autonomy and decision-making powers; lack of project management skills; political meddling and power politics; individuals' unwillingness to participate, lack of team spirit; and executive impatience and push for short-term results. In addition, the transformation from traditional, structured organization to teamwork had some problems. The most fundamental problems that teams confronted came from the existing work structure because the traditional hierarchy of work had influenced the foundation of standardization of work activity. The change of organizational structure was a key fundamental in fostering good teamwork (Wellins, Byham, & Wilson, 1991).

Mohamed et al. (2004) identified that many cross-functional teams' constraints are caused by organizational structure; for example, in the vertical organizational structure, middle managers were not willing to share their power. In addition, in a cross-functional team context, there was a diverse nature of team members which possibly created a communication challenge due to dissimilar languages or background as a result of territorial hostility (Mohamed, Stankosky, & Murray, 2004, p. 131).

In some cases, an individual team member played a major part and kept too much control. These individual agendas blurred the team's vision (Larson & LaFasto, 1989). Therefore, keeping focused on their goals assisted a team to alleviate and mitigate the individualism problems. The other crucial problem was support and commitment from top management. This problem directly affected a team's morale (Harrington, 1994). An organization needed to promote a foundation of commitment to the teamwork concept in order to make team members feel comfortable with their new responsibilities (Wellins, Byham, & Wilson, 1991). Training played significant roles in teamwork. Lack of training was one of the most common reasons for team failures because it required specific training to accomplish a cohesive work (Harrington, 1994). The overlooked obstacles to success in teamwork were cultural barriers and communication problems. These two problems deterred team cohesion. Supportive and clear communication helped team members to keep up to date and involved in the team's work (Conti & Kleiner, 1997).

Longenecker and Neubert (2000) researched the factors that prevented managers working as a team. These factors were personal conflicts/egos, conflicting goals, rewards based on individual performance, lack of unifying goals/direction/focus, ineffective leadership, lack of team skills, systemic and structural barriers to cooperation, teamwork and cooperation were not being top priority/no accountability for cooperation, personal agendas/politics/turf wars, and no perceived benefits for cooperation. These factors consequently created communication breakdowns, decreased performance and productivity, wasted resources and effort. They also created ill-will/bad feeling/decrease in morale, loss of coordination/planning breakdowns, failure to fix problems and improve processes, loss of focus on the customer and profits, increased workplace conflicts/political activity, increased job-related stress/workplace tension, and setting a poor example for the workforce (Longenecker & Neubert, 2000, p. 39).

In addition, Natale, Libertella, and Rothschild (1995) presented five principles for employment of the team concept. These five principles were that teams needed 1) team direction and commitment from executive level; 2) to underline the fear of job-loss and loss of control; 3) trust from management and employee; 4) skill-based

training and communication training; and 5) rewards and promotion for their performance through teamwork.

In conclusion, this was one of the most effective ways to increase and promote the team concept in an organization. Team spirit, a sense of loyalty and dedication of teamwork brought together a team of individuals and developed team commitment and team committed to team goals. Developing commitment needed personal involvement from each member. A simple activity like writing the team's mission and vision statements increased team spirit and commitment (Larson & LaFasto, 1989). A clear and elevated goal played a supportive role in team success. The clear goal promoted good understanding within the team and the elevated goal kept team members on focus and avoided the political issues and individual agendas (Larson & LaFasto, 1989). The careful selection of team members or team composition was one of the most critical factors for team success. Job analysis for technical skills, motivational traits, and job skills was a beneficial activity to bring together team members. The next technique was training. Team members needed training in three categories: job skills, team interactive skills, and quality/action skills. Job skills covered all basic and technical knowledge that was necessary to perform the job. Team interactive skills included all interpersonal and communication skills that helped team members to become more effective participants. Quality and action skills encompassed the identification of problems and development of recommendations for improvement (Wellins, Byham, & Wilson, 1991). The final tools to improve team effectiveness were analysis tools. Teams used tools to improve and understand functional work-flow (Sashkin & Sashkin, 1994). By using tools such as Pareto, flowcharts, and work-flow diagrams, teams visualized and defined the problems and discovered possible solutions.

2.2.4.2 Challenges of teamwork

The challenge of cross-functional teams was the level of information exchange among team members (Denison, Hart, & Kahn, 1996). Patrashkova, McComb, Green, and Compton (2003) found that the level of communication, irrespective of whether it was low or high, could impede team performance. Boisot (1995) explained that team members were limited in the amount of information that they were be able to process.

Therefore, if there was information overload, this decreased performance. In contrast, if there was infrequent communication, this situation created a short supply of important information which led to low performance (Goodman, Ravlin, & Argote, 1986). More recent teamwork research found that insufficient interpersonal skills, lack of training for both members and leaders, ineffective leaders, and unclear and constantly changing project goals and outcomes were the aspect that management needed to pay attention to (Barczak & Wilemon, 2005).

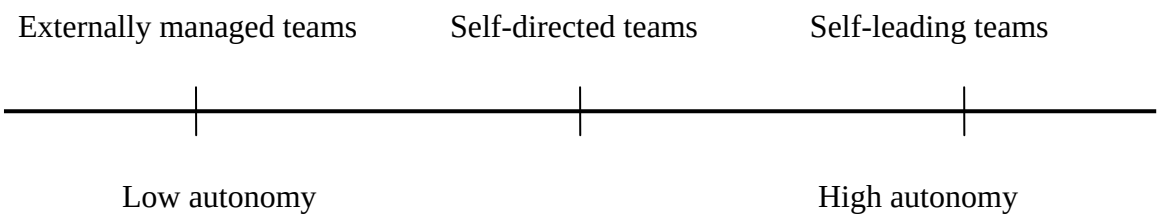
2.2.5 Enabling factors for teamwork

Frequently cited as enabling factors for teamwork were team empowerment and self-management, and attention to team selection and team formations (Hackman & Powell, 2004). Hackman and Powell found that recognition of people issues and support for training and leadership development; facilitating technology such as e-mail, teamware, and telecommunications; adoption of a team approach for the whole organization; use of tangible and symbolic team-based rewards; and removing the team from the dominant bureaucracy, enabled team effectiveness. The authors also suggested that it was crucial for organizations and their executive to identify the most intractable barriers and enabling factors. Drew and Coulson-Thomas (1996) found that the implementation of teamwork was evident in increasing speed of responses and actions. The importance of cross-functional teams was acknowledged as accelerating innovation and cycle time. Teamwork also was expected to provide major contributions in terms of increasing efficiency, managerial productivity, and delivery outputs. The authors discovered some significant enabling factors for team effort. They found that clarity of goals and objectives were ranked at number one closely followed by personal commitment and supporting management attitudes. There were five solutions to help managers to work together as a team. These solutions were 1) develop a consensus around a common vision and superordinate goals that focused on organizational outcomes; 2) implement team-based performance measurement, feedback, and reward systems; 3) ensure that top management demonstrated and fostered cooperation; 4) promote the use of team building, skill development, and team training as organizational common practice; and 5) facilitate management team involvement and ownership of decision processes and outcomes (Longenecker & Neubert, 2000, p. 40).

2.2.5.1 Team leadership and typology of leadership

Teams vary in design, and some teams have high ability and freedom to lead themselves. The ability and capacity for team self-leadership depends on the hierarchical relationship and control structure within organizations. Some organizations allow a great deal of freedom for teams to govern themselves; in contrast some organizations keep tight control with little autonomy. Cohen, Ledford, and Spreitzer (1996) found that the level of autonomy had significant benefits associated with performance. Stewart et al. (1999) presented a continuum ranging from externally managed teams to self-leading teams. The continuum of team self-leadership is shown in Figure 2.2.

Figure 2.2:
A continuum of team self-leadership



Source: (Stewart, Manz, & Sims, 1999, p. 35)

Externally managed teams have strong leaders who do all the decision-making for team members. Team members have little autonomy to design how to do their work. Team members complete the assigned tasks based on the leader's prescriptions and instructions. Team members are not allowed to make decisions and are always discouraged from making creative suggestions.

Self-managing teams have more freedom than externally managed teams. This team is expected to alter, manage and improve their working process. This team performs some traditional leadership duties and has authority and responsibility to manage their team.

Self-leading teams are at the high end of continuum. This team is allowed to decide how to work, what to do, and how to do it. Team members have the ultimate source of

control and the team has high commitment to perform tasks, based on intrinsic motivation (Stewart, Manz, & Sims, 1999, p. 35-6).

However, the self-leading team is not suitable and appropriate for all situations. The self-leading team is most appropriate when team members need a high level of autonomy to perform their work and team members have a high level of technical ability and individuals have self-leadership ability. A self-leading team also works best in a dynamic environment which requires a high degree of flexibility and creativity.

Stewart et al. (1999) presented the typology of leadership effect on team performance. The authors described how various leaderships affected team performance. There are two broad dimensions underlying various types of leaderships. The first dimension concerned leader's power orientation. Strong leaders are very autocratic and tend to use command and threat to ensure the others follow their wishes. Super leaders are more democratic and allow others some substantial latitude to determine a course of direction. The second dimension focused on the leader involvement. Some leaders are involved with day-to-day activities; whereas other leaders are hands off. These two dimensions illustrate the effect of leadership on a team.

Overpowering leadership is a combination of an active and autocratic leader. This type of leader is labeled as a strongman leader, who is involved in everything that the team does. Such leaders believe that their way is the right way to accomplish things. Strongman leaders like to use threats and intimidation in order to push team members to perform.

Powerless leadership has a passive and autocratic leadership style. This type of leader is not involved in day-to-day operations and activities. However, the leader still retains significant control over the team and determines the team functions. Team decisions and operations need to be congruent with the leader's desired actions.

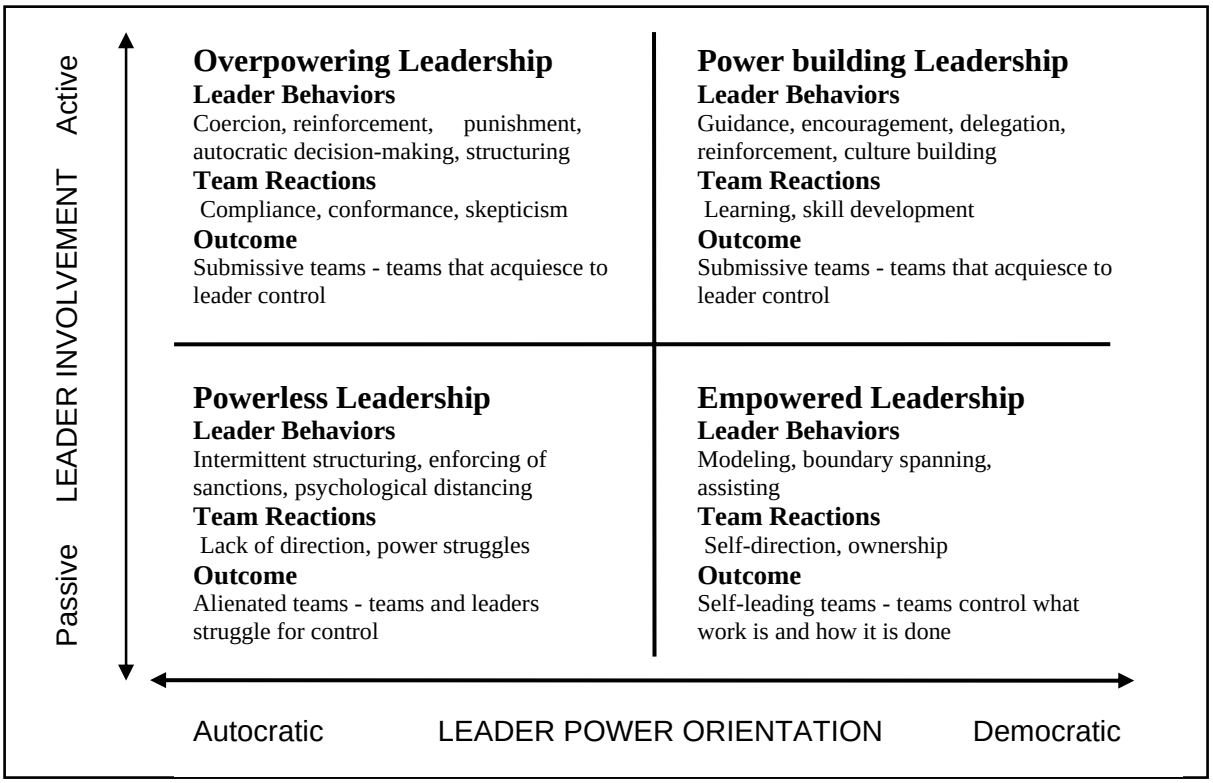
Power-building leadership takes active and democratic perspectives. This type of leader encompasses elements of both the visionary hero and super leader. The leader allows some degree of discretion for team members to exercise and determine their

work, and at the same time, the leader also teaches some skills and provides some guidance. Team leaders delegate, encourage, reinforce, and cooperate while helping to create a vision of successful team self-leadership. Team leaders wish to teach team members how to lead themselves. Team members are taught technical skills, self-leadership skills, goal setting, and conflict reduction techniques.

Empowered leadership These leaders are passive and democratic leaders. They allow team members to design their own work process and to determine their own strategic directions. The team leader's role changes from leader to facilitator and coach (Stewart, Manz, & Sims, 1999, p. 101-104). The summary of typology of leadership is depicted in Figure 2.3.

Figure 2.3

Typology of leadership's effect on a team



Source: (Stewart & Manz, 1995, p.752)

According to Nurmi (1996), there are four leadership styles: dictatorial, compromising, integrative, and synergistic . The dictatorial leader dictates the

outcome of the team and the rest of team members make no contribution. There is no teamwork within the team. This type of leadership is called an autocratic style. The compromising type allows disputes to be arbitrated; the average solution is taken, even though the outcome remains lower than the best possible. An integrative teamwork leader encourages all resources to be gathered into an integrated outcome for the team. This style requires active leadership, active listening, acceptance of different views, ability to present personal views and change them on the basis of communications with others, ability to objectify issues, and dilution of status and prestige, time, and patience to get all resources integrated into fair outcomes. Synergistic teamwork creates an outcome exceeding 100% of input. It is the most productive style. Synergistic teamwork needs a high level of enthusiasm, motivation and commitment, experience, pride in the team and indifference to rules. The author found that synergistic teamwork created something new and greater than the addition of individual team members' resources and offered the best percentage outcome. Nurmi concluded that integrative teamwork created a 100% solution and synergistic teamwork created in excess of a 100% solution. In contrast, dictated teamwork generated a 20-50 % solution and compromising achieved 33.3% of the solution. Integrative teamwork achieved a 100% solution by pooling the team members' expertise, and synergistic teamwork achieved in excess of 100% because team members created new solutions (Nurmi, 1996, p.13). McDonoughill (2000) found that team leadership was regarded as contributing to team success.

2.2.5.2 Team Diversity

Organizations are increasingly adopting some forms of work group composition that include differences in functions or educational background, for example cross-functional teams, mergers, acquisitions, and joint ventures. These work groups introduce diversity into work groups (van Knippenberg & Schippers, 2007). Team diversity refers to the compositional distributions of team members on any personal attribute that potentially lead to perception that team members differed from each other (Jackson, Joshi, & Erhardt, 2003; van Knippenberg, De Dreu, & Homan, 2004; Williams & O'Reilly, 1998). Team members differed from each other on a large number of attributes ranging through differences in age, gender, race, expertise,

personality, and values (Harrison, Price, Gavin, & Florey, 2002; Jackson, Joshi, & Erhardt, 2003; van Knippenberg, De Dreu, & Homan, 2004).

Diversity became an important issue at all levels in organizations from boardroom to back office and, significantly, it was shown that diversity was necessary to productivity (Jarzabkowski & Searle, 2004). In conversation regarding "leading teams", Hackman and Powell (2004) emphasized that when a team needed to be composed, it was necessary to pay great attention and ensure that the team included team members who had knowledge, skills, and experience to perform the work. In addition, the team needed diversity of knowledge, skills, perspectives and experience as it would not gain full benefit from being a team if all members were the same, whether demographically or in terms of their knowledge base or skills. It was the diversity in all areas that was so important; therefore a team that had a "right mix" of personalities or behavioral styles had to be built. Liang, Liu, Lin, and Lin (2007) investigated knowledge diversity and team performance in a software development team. The authors found that knowledge diversity increased task conflict, which in turn had significant positive effects on team performance. In contrast, if there was value diversity within the team, it increased relationship conflicts which decreased team performance.

Fitzpatrick and Askin (2005) argued that to create effective human teams, team members needed to have sufficient breadth and depth of technical skills as well as interpersonal skills. Eriksen and Beauvais (2000) found that team composition in which individuals had different types of personalities and attributes processed greater potential creativities than individuals with similar types of personalities and attributes. Team diversity created and increased innovation and creativity in team decision-making and problem-solving. Team functional diversity referred to the number of functional areas as well as external stakeholders represented on the team. Carbonell and Rodriguez (2006) found that functional diversity had a greater positive impact on the speed of technologically complex products. This was because, at a high level of functional diversity, the increase of functional diversity had a positive impact on the speed of innovation. The more complex and difficult the project, the more the project needed significant functional interdependence to speed up execution. Yeh and Chou

(2005) found that functional diversity had a negative effect on team satisfaction, whereas positional diversity had a positive effect on team satisfaction.

Auh and Menguc (2006) note that when top management team (TMT) functional diversity was leveraged with TMT experience diversity, this combined tacit knowledge operated as transformational capability and strengthened the relationship between customer orientation and organizational performance. The authors found that when both functional diversity and experience diversity increased, the organizational performance and customer orientation were also increased. Auh and Menguc (2005a) said that when interfunctional coordination was absent, organizations did not have a mechanism to resolve the differences which occurred in functionally diverse teams because there was inefficient communication and coordination. The value of interfunctional coordination was great under the condition of a high turbulence environment. Auh and Menguc (2005b) believed that TMT diversity and interfunctional coordination were the source of innovativeness. TMT diversity comprised functional diversity, experience diversity and educational diversity, while interfunctional coordination referred to the collaboration and integration of various functional areas or departments within organizations for enhancing communication and information in order to achieve better organizational goals. In other words, interfunctional coordination was described as the ability of various functional areas to accommodate different views and work around the conflicting issues by leaving the functional interests and focusing on the organization as a whole. The authors found that when interfunctional coordination increased, the effects of experience and educational diversity on innovativeness were positively significant.

Diversity of team members reduces development time. Karagozoglu and Brown (1993) and Sethi, Smith, and Park (2001) supported the finding that high diversity in a team decreased the development cycle time by increasing goal congruence in the functional team, bringing high creativities to problem-solving, and ensuring availability of significant inputs. Stebbins and Shani (1995) stated that the collaborative knowledge teams provided an organizational edge of creativity and innovation. Mohamed et al.(2004) agreed that the combination of collegial relations, personal competence, multiskills, tacit knowledge, diversity and technology assisted the creation of brainpower for organizations. Kock and McQueen (1996) believed

that there was a reason to promote a specialization of work and accelerated the growth and specialization of knowledge. As knowledge growth became more fragmented and abundant, therefore, there was the need for specialized departments comprised of teams of experts in organizations (Kock & McQueen, 1996, p. 14).

Faultlines in a diverse team are the hypothetical dividing lines that can potentially split a group into two or more subgroups based on the alignment of two or more characteristics (Molleman, 2005; Thatcher, Jehn, & Zanutto, 2003). Gratton, Voigt, and Erickson (2007) proposed that the attributes of faultlines could be surface-level or deep-level. Surface-level faultlines included gender, age, nationality, and education, whereas the deep-level faultlines included values, personality, and knowledge. Strong faultlines created a fracture in the social fabric of the team. This fracture became a source of tension and a barrier to creating trust and goodwill and to the exchange of knowledge and information. Rico, Molleman, Sanchez-Manzanares, and Van der Vegt (2007) found that teams with equivalent levels of diversity made better decisions if their diversity dimensions were not aligned. When diversity dimensions were crosscut, it was less likely that subgroups would emerge, and under this circumstance, teams could take more advantage of the differences between their members. In terms of social integration, a team with weak faultlines has a higher level of social integration than one with strong faultlines.

2.2.5.3 Team climate, team member proximity and team quality

The concept of sharedness was developed by Anderson and West (1998). The concept of sharedness needed the following three criteria: a) individuals interacted at work, at least on an infrequent basis; b) some common goals or attainable outcomes which predisposed individuals toward collative actions; and c) sufficient task interdependence for individuals to develop shared understandings and expected patterns of behavior. Individuals who belonged to a proximal work team and interacted with colleagues were likely to develop shared patterns of understanding and norms of behavior; therefore, there was an opportunity for a sharedness climate to evolve. Klivimaki and Elovainio (1999) added that team climate included perceptions of a shared commitment to teamwork, participative safety, high standards of performance, and systemic support for cooperation. Proudfoot et al. (2007)

investigated the team climate for innovation in the healthcare industry. The authors found that in these team climates, team vision, participative safety, task orientation, and support for innovation contributed the same results as previous research which promoted job satisfaction and team effectiveness.

Loo (2003) studied team climate in project management teams and found that it was an important factor to promote team effectiveness. Loo found that interpersonal relationships among team members, enthusiasm about their project, and expectation of quality project work were supportive and positive in a team climate. Hoegl and Proserpio (2004) argued that team proximity had a positive association with the quality of teamwork. They found that team proximity was positively related to communication, coordination, mutual support, effort, and cohesion among team members. McDonoughill (2000) found that productive climate was mentioned as associated with team success.

2.2.5.4 Team goals

A team goal is an overall goal that is shared by team members. This team goal concerns what the whole team is trying to achieve or accomplish. Both individual and team goals have to be clearly defined and goals also need to be established within the context or scope of a team's objectives and goals (Varney, 1990). Aube and Rousseau (2005) found that team goal commitment was positively related to team performance, the quality of group experience, and team viability. The research findings also showed that task interdependence moderated the relationship between team goal commitment and team performance. Looking at the goal difficulty and team adaptation, LePine (2005) found that a team with goal difficulties and members with high-performance orientation members were unlikely to adapt, whereas a team with goal difficulties and members with high-learning orientation were likely to adapt. McDonoughill (2000) found that an appropriate goal was posited and cited to contribute to team success.

Stewart et al. (1999) noted that over 400 projects studied the effect of goals on performance. The majority of studies concluded that performance increased through the establishment of specific goals. One major issue of developing a team was a sense of direction. Teams needed clear directions which were derived from communicated

goals. Therefore, the goal was defined as something that the team attempted to achieve and accomplish or the object of actions. Six Sigma was known as setting specific challenging process improvement goals and a clear goal was a significant part of Six Sigma (Pande, Neuman, & Cavanagh, 2000). Linderman, Schroeder, and Choo (2006) found empirical support for goals and effective team improvement in Six Sigma. The authors suggested that goals can be effective in Six Sigma when the team adhered to the Six Sigma tools and methods.

2.2.5.5 Team size

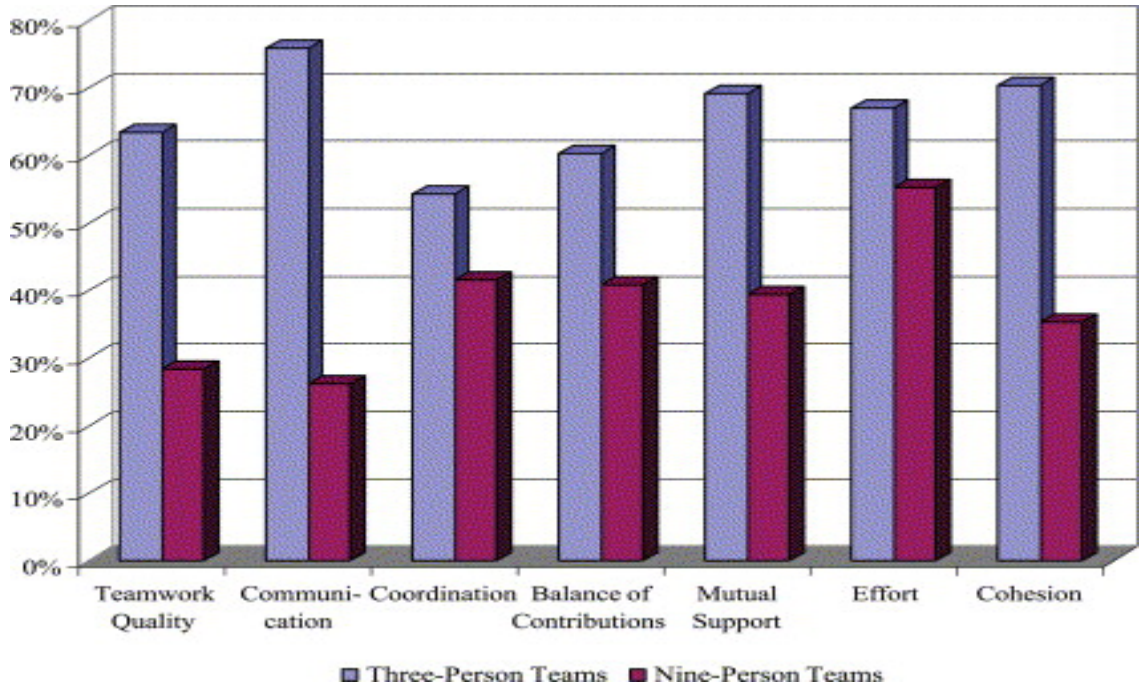
Previous research showed that team size does matter in team performance. Ziller (1957), Steiner (1966) and Hackman (1987) all agreed that a smaller team was shown to work better than a larger team. Hackman believed that team size was an influential factor for team process, team collaboration, and team performance. Large team size had the potential to create some difficulties. Zenger and Lawrence (1989) found that it became significantly difficult for a large team to share technical and coordinating information. Hackman (1990) mentioned, regarding the size of a team, that it was frequently seen that teams tended to be too large, the reason being that team-builders needed to ensure adequate resources or to establish representation of every function in order for the team to receive its output. Hackman said this approach was politically correct, but that it brought problems. The teams became far too large to accomplish anything.

Hoegl (2005) investigated the effect of team size on 58 software development teams. He found that the top five teams in terms of teamwork quality included three to six members with an average of 4.4 members; in contrast, the bottom five teams had seven to nine members with an average of 7.8 members. In addition, the success rate of three-member team was 63% of the teamwork quality of the best team, whereas the team of nine members achieved an average of 28% of the teamwork quality of the best team. Figure 2.4 shows the differences of small and large teams based on the six facets of teamwork quality. Although, there was no indication regarding optimal team size, the Figure 2.4 shows that a team of three members worked better than a team of nine members. As a rule of thumb, Hackman and Powell (2004) suggested single digits in team size. The ideal size was six people (Hackman & Powell, 2004).

Zuidema and Kleiner (1994) agreed that the basic structure involved taking a small team of employees, somewhere between 3 to 30 employees, but the typical number was 6 to10 employees. Clifford and Sohal (1998) also agreed, and stated that the size of the team and its composition was recommended to be no more than 11 members in order to maintain a focused team.

Figure 2.4:

Smaller teams - better teamwork



Source: (Hoegl, 2005, p. 212)

Bray, Kerr, and Atkin (1978) found with increased team size, it became more difficult for team members to contribute their knowledge, skills and experience at their full potential. Large teams had a number of nonparticipating members. However, no previous research paper or evidence was found to prove either the specific numbers or the indication of an exact optimal range. Hackman (1987) suggested that the right number of team members depended on the work to be performed and task requirements. Some tasks needed more team members than others did. Hoegl, Parboteeth, and Gemuenden (2003) agreed that team size had to be determined by two factors: staffing requirements and teamwork requirements. Staffing requirements depended on the size of project tasks while teamwork requirements relied on the

complexity and uncertainty of project tasks. As a project either became larger in size or complex and uncertain, teamwork needed a more diverse set of skills and knowledge. However, Sutter (2005) found that four heads were better than two or one in an experimental beauty contest game. The finding indicated that team size had an effect on team decision-making, at least in a context where information processing was an important aspect of the decision.

Apart from team size, team proximity was also important. Hoegl and Proserpio (2004) posited that team proximity had a positive association with the quality of teamwork. The authors found that team proximity was positively related to communication, coordination, mutual support, effort, and cohesion among team members. Most recent research on team size found that team output increased by adding a new member, but beyond some value of team size, the marginal cost of an additional team member exceeded the marginal value of the team's production. The authors suggested that change of communication and processing technology led to an increase in the team's maximum product capacity. In addition, there were a number of technology improvement options; the combination of technology improvements and team size yielded the most efficient solution to increase team output (Tohidi & Tarokh, 2006).

2.2.5.6 Team communication

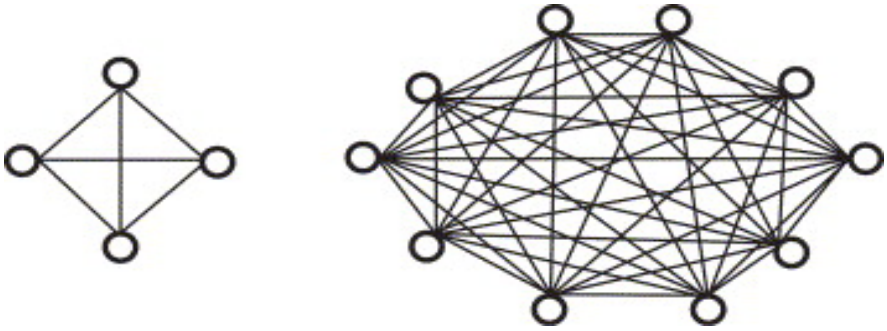
Teams communicate in three ways: face-to-face, desktop videoconference, or text-based chat (Hambley, O'Neill, & Kline, 2007). The communication medium has significant effects on team interaction style and cohesion. Face-to-face and videoconference promote higher team cohesion than does chat. Team communication is an essential factor that needs to be addressed and considered. Kirkman and Rosen (1999) argued that communication and trust are critical to teamwork. Brown and Eisenhardt (1995) stated that communication is an essential component of new product development. Beckhard and Pritchard (1992) argued that the amount of effort that is expended on communication was often underestimated and communication is a prerequisite for change in human attitudes, behaviors, and ways of working. When communication collapsed and employees' morale decreased, organizations became ineffective, incompetent, and confused (Mohamed, Stankosky, & Murray, 2004). Yu (2005) reported that earlier research indicated that effective teamwork required that

team members communicated an average one to three times a week. In the innovative team, team members tended to communicate more than this.

Hoegl and Gemuenden (2001) perceived collaborative work process, communication, coordination, balance of member contributions, mutual support, effort, and cohesion as facets of teamwork quality (Hoegl & Gemuenden, 2001). They also found that high quality teamwork appeared to show that members openly communicated, coordinated their individual activities, ensured that team members contributed their knowledge to their full potential, mutually supported each other during discussion, maintained a high level of effort, and encouraged team cohesion among team members. Teamwork quality showed a significant impact on team performance. An effective team seemed to have more open communication than a less effective team. Open communication enhanced decision quality and reinforced team consensus and acceptance. Open communication was central to gaining sincere involvement from team members. Open communications were assessed by their extent, communication between team leaders and team members, and shared information (Yoon, 2005). As teams grew and the number of team members expanded, the complexity of communication increased. The communication structure between all members became dramatically complicated. At full communication, a team of 4 members had total of 6 links, while a 10 member team had 45 links. The communication between all members becomes increasingly difficult with a large team, so it needs good coordination from its various members (Hoegl, 2005). The complexity of full communication between small and large teams is shown in Figure 2.5.

Figure 2.5:

Comparison of small and large team communication structure



Source: (Hoegl, 2005, p. 211)

In a cross-functional team, Dougherty (1992) pointed out that team members had unique perspectives and thought about their work because they all came from different functional areas. Therefore, team members needed to compensate for their different perspectives, otherwise team members would face difficult times when team members collaborated with others. Hutchins (1995) found that more communication was not always better than less communication. In the case where team members exchanged too much information, their cognitive map became too similar, and, as a result, the team became either less innovative or incapable of innovation. On the other hand, in the case of less communication, the team members were not able to bring their cognitive map close enough to each other for a mutual understanding.

In their recent study on communication of cross-functional teams, Patrashkova and McComb (2004) indicated that both frequency and duration of communication for both synchronous and asynchronous communication did not matter for effective team performance but the amount of exchange of information did matter. They argued that team performance improved when the right amount of information was exchanged between team members. Too little or too much information exchanged did not support or improve team performance. Grice, Gallois, Jones, Paulsen, and Callan (2006) investigated the level of information sharing and team communication within different types of work team. The result indicated that team members rated communication from their own occupational work team more positively than other occupational groups within the work team. The high work team identifiers were more likely to share information with members from different occupations than were low work team identifiers, whereas high occupational identifiers were more likely to share information within the occupational group low occupational identifiers. These results showed the bias within different groups. De Vries, van den Hooff, and de Ridder (2006) found that team members' communication style and job-related cognition related to knowledge sharing in organizations. The results showed that these two variables were mediated by knowledge-sharing attitudes such as eagerness and willingness to share knowledge. The authors also found that team members' agreeableness, team extraversion, personal job satisfaction, and performance beliefs had positive implications for the willingness to share knowledge with the other team members.

2.2.5.7 Team empowerment

Mohamed et al. (2004) found that bringing people together was not sufficient; it was necessary for team members to be empowered and offered an opportunity to manage or have self-management. They also suggested that team members needed sufficient information to investigate problems, derive inferences, find a solution, determine the risks, and plan for full implementation without fear of failing or making mistakes. Especially when honest mistakes were made, team members needed to add unplanned mistakes as lessons learned for creative insight. Gerwin (1999) defined team empowerment as "the range of decisions the team is authorized to make in order to get its work done" (Gerwin, 1999, p.30). To empower meant to enable, allow or permit. Empowerment referred to enablement, either self-initiated or initiated by others. There were two main aspects regarding organizational empowerment: building, developing and increasing power through co-operation, sharing and working together; and making a commitment to common goals, taking risks and demonstrating initiative and creativity (Wilson, 1996, p.3).

The key to success in corporate organizations is to empower the employees (Natale, Libertella, & Rothschild, 1995). Empowerment encourages employees to participate actively in their decision-making process and allows team members to achieve recognition, involvement, and sense of ownership. These contributions created and improved job satisfaction and morale (Wilson, 1996). Wilson suggested the techniques to enable empowerment in a team. She suggested that the team leader needed to give team members permission to be participative members, create opportunities for team members to express their thoughts, ideas, and opinions, and encourage team members to listen and give feedback to other team members (Wilson, 1996, p.29). McDonoughill (2000) found that empowering the team with the necessary decision-making power was associated with team success.

Previous literature has argued that empowerment is assessed by the extent of autonomy and participation. Team members are empowered to make decisions for which they have appropriate knowledge, skills, attitudes, and information. It is clear from research findings that as far as empowerment went, the team members were keen to have more autonomy and to become more involved in the decision-making

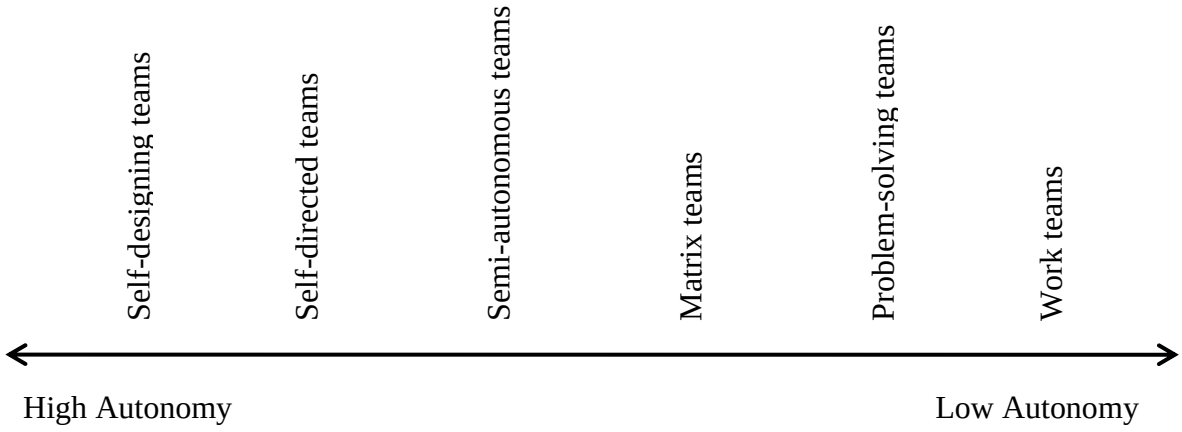
process (Yoon, (2005). Chen, Kirkman, Kanfer, Allen, and Rosen (2007) suggested that to empower individual team members, team leaders needed to ensure that they developed high levels of mutual trust and respect for their team members. For team empowerment, team leaders needed to ensure that they delegated sufficient autonomy and responsibility to all members in their team. Team members needed to be involved in all decision-making and encouraged to self-manage their performance. Cooney (2004) agreed that empowered teams were delegated managerial responsibilities and were encouraged to identify with management's goals and objectives. However, empowered teams were closely integrated within managerial systems of control rather than being autonomous from the systems of control. There were some prior research studies which found that empowerment was correlated with enhanced team effectiveness (Hyatt & Ruddy, 1997; Kirkman & Rosen, 1999; Mathieu, Gilson, & Ruddy, 2006).

2.2.5.8 Team autonomy

The success rate of team implementation depends on the organizational culture. Tata (2000) investigated the relationship between levels of autonomy and organizational culture. She argued that the success of teamwork implementation depended on the context of organizational culture and structure. Teamwork was not appropriate or practical in an organizational culture focusing on retaining power in managerial hands because teamwork changed the way people worked and interacted in organizations. She presented six types of self-management teams, noting that self-management was the team-level equivalent of autonomy at an individual level, which increased the level of team effectiveness by increasing team members' sense of responsibility and ownership of their work. She explained the continuum of the level of autonomy for six types of self-management teams. At one end, work teams and problem-solving teams had the lowest autonomy. Matrix teams and semi-autonomous teams had a moderate level of autonomy. The teams that had the highest level of autonomy were self-directed teams and self-designing teams. Different teamwork structures had different levels of autonomy. The continuum of levels of team autonomy is shown in Figure 2.6.

Figure 2.6:

Levels of team autonomy



Source: (Tata, 2000, p.188)

Problem-solving teams are temporary teams formed for specific problem-solving; individual members are assigned by departments to work on time-bound tasks. In **Matrix teams**, also called coordination or cross-functional teams, team members come from various parts of an organization and represent different departments. The team members come to work together for a specific assignment that addresses broad issues. **Semi-autonomous teams** are joined together for a long period of time and have a moderate level of autonomy. This team normally has a team facilitator, normally called team leader, coordinator or supervisor. The team facilitator normally performs an interface and coordination with upper management. **Self-directed teams** are also called self-managing and employee involvement teams. This team type has a high level of autonomy and decision-making responsibility. The management team has limited control over them; the role of management is to empower self-directed teams and assist teams to develop self management. Self-managing teams also have a high level of autonomy; these teams have authority over their definitions as work units and their integration with the larger system within and outside the organizations (Tata, 2000, p. 188-189). Hackman and Powell state that a “truly self-directed performing unit” was one where the team as a whole has responsibility not just for doing work, but also for monitoring and managing how that work gets done (Hackman & Powell, 2004, p.85).

In the context of information systems development, Janz (1999) found there was a positive relationship between the level of autonomy and affective work outcomes, and perceptions of performance. She found that self-directed teams improved their satisfaction and motivation level when they had team autonomy.

2.2.5.9 Teams structure and organizational culture

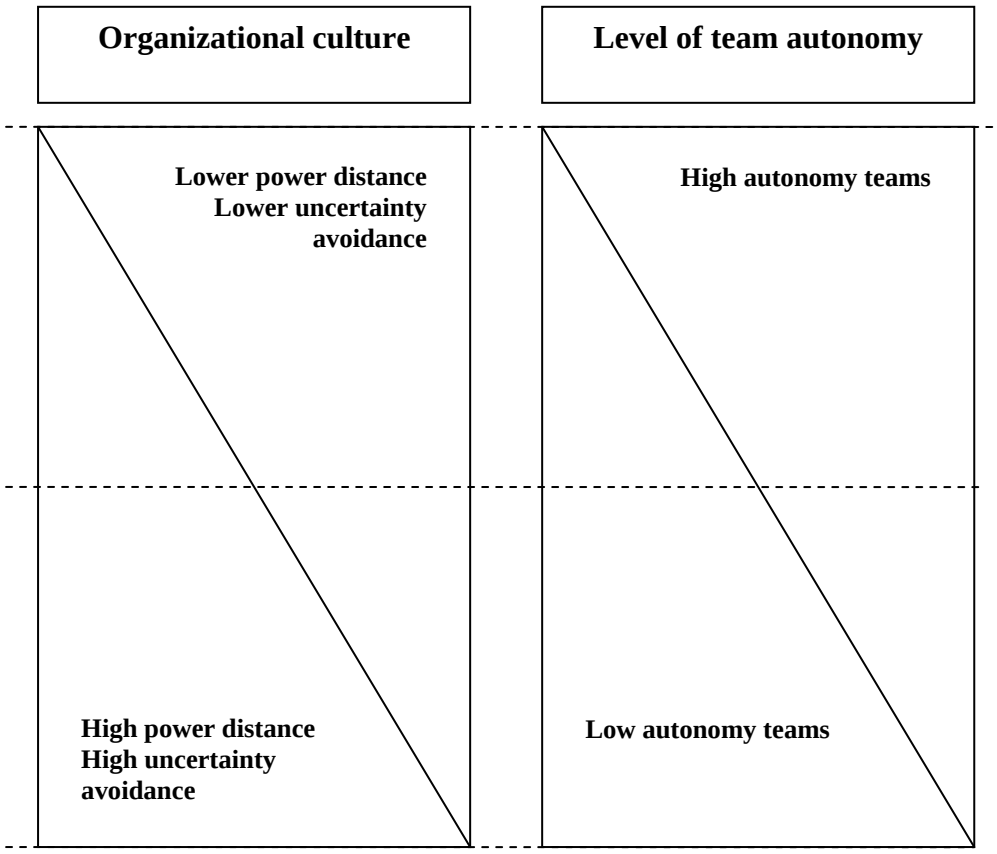
Cultural awareness is learned by groups over a period of time in order to solve their problems for survival in an external environment (Schein, 1990). Organizational, culture emerged in organizations based on organizational histories and experiences, and began with the founder and members of the organization who shared the successful growth and had developed the assumptions regarding the world and how to succeed. These assumptions were taught and passed to the new members of the organization (Schein, 1996). Schein (1984) provided a formal definition

> Organizational culture is the pattern of basic assumptions that a given group has invented, discovered, or developed in learning to cope with its problems of external adaptation and internal integration, and that have worked well enough to be considered valid, and therefore, to be taught to new members as the correct way to perceive, think, and feel in relation to those problems. (Schein, 1984, p.3)

In addition, according to Hofstede (1997), organizational culture refers to the shared values and beliefs of organizational members, while organizational structure reflects the value-based choices made by organizations (Quinn, 1988). Quinn investigated how different value orientations of organizational culture influence organizational structures. He found one dimension of value systems that related to organizational structure which was control-flexibility. The control-orientation value systems attempted to strengthen the management authority by centralizing decision-making in managerial hands while decreasing employee discretion. This type of organizational culture and structure was suitable for a low level of autonomy such as problem-solving teams or work teams (Tata, 2000). In the opposite type of structure, organizations with flexibility-orientation attempted to decentralize decision-making. Decision-making was delegated to teams for diagnosing problems and implementing solutions. This type of organization was suited to a high level of autonomy, like a self-directed team. The relationship of organizational culture and structure with levels of autonomy is presented in Figure 2.7.

In conclusion, teams had common features but not all teams share a common structure. There were different types of teamwork and each type was created to accomplish different goals. The two most common types of teamwork were self-directed work team and cross-functional teams (Conti & Kleiner, 1997).

Figure 2.7:
Model of relationship between organizational culture and structure, and level of autonomy



Source: Adapted from (Tata, 2000, p.191).

2.2.5.10 Team member participation

Locke, Schweiger, and Latham (1986) provided a short definition of participation as a managerial technique of joint decision-making between managers and employees. Marrow, Bowers, and Seashore (1967) gave more details regarding participation as an overall management philosophy and the way of involving employees in meaningful decisions. However, this meaningful involvement required several things; for example, employees had to experience participation on a given issue as feasible and

realistic, employees needed to be informed and any limits on employees' decision-making clarified, and participation had to thrive in an organizational climate of trust and openness. Chisholm and Vansina (1993) believed that each organization needs to discover or invent its own meaningful participation process. Therefore, organizations have to find their unique form of participation in order to utilize the benefits of meaningful participation and decision-making. Cotton, Vollrath, Froggatt, Lengnick-Hall, and Jennings (1988) found from their study that different forms of participation decision-making (PDM) were associated with different outcomes; for example, informal participation and employee ownership were effective in terms of productivity and satisfaction, while short term participation was not effective on either criterion. Participation in work decisions appeared to increase productivity but had a less consistent increase in satisfaction. Representative participation did not increase productivity but increased satisfaction.

Participation in goal setting seemed to be an effective strategy to enhance goal acceptance Erez (1985) found. The author found that there was a relationship between goal setting and performance. Therefore, participation affected performance through its effect of goal acceptance. Gracia-Lorenzo, Prado, and Arca (2000) argued that employee involvement or participation in continuous improvement was adopted not only by large companies but also SMEs. Rees and Porter (1998) posited that the employee participation was influenced by managerial style. The greatest way to achieve employee participation was through the development of a constructive relationship between employees and their immediate boss. The authors suggested that all forms of participation depended on the enthusiasm and ability of line managers at all levels. Cassar (1999) agreed that the effectiveness of employee participation was associated with senior managers and a managerial style that allowed free working space. Tonnessen (2005) claimed that the research findings showed that efficiency and an improved working environment were created by the implementation of company wide employee participation. Gyan-Buffour (1999) showed in his research findings that organizations with a high level of employee participation, flexible organizational structure, and flexible work design outperformed organizations which did not have high levels of employee participation and flexible work design.

Griffin (1997) found that cross-functional interface was positively related to the outcome of new product development. Song and Noh (2006) found similar results to Griffin in that a cross-functional interface played a significant role in the success of a product development process. These results were similar to research findings by Song and Thieme (2006), who found that good relationships between marketing and R&D promoted participation during the decision-making process. Mohamed et al. (2004) believed that a face-to-face meeting during team discussion and participation was the source of knowledge transfer, creation of new ideas and alternative solutions.

2.2.5.11 Team knowledge sharing and team learning

A simplified definition of knowledge sharing was given by Storey (2001). Storey presented the idea that knowledge sharing was the time that people who had a common purpose and experienced the same problem came to work together in order to exchange ideas and information. MacNeil (2003) presented the way to streamline organizational structure suggesting that organizations needed to have flatter management layers, adopt the teamwork process, and employee empowerment. These changes would allow managers to encourage knowledge sharing in teams. Ellinger and Bostrum (2002) found that the supervisors as facilitators was an important source for knowledge-sharing and encouraging collective learning. MacNeil (2004) agreed that supervisors needed to be a facilitator of knowledge sharing in their teams. Storey and Quintas (2001) commented that knowledge can be transferred when individual and collective learning were taking place.

Antonacopoulou (1999) said learning existed when the right context and climate, such as encouragement, facilitators, and rewards for learning, existed. This organizational climate stimulated individuals to have a positive attitude for learning and overcome resistance to learning (Yang, (2004). Yang agreed that organizational climate had an effect on knowledge sharing. The more organizational climate organizations had, the greater the degree of organizational effectiveness because a climate of sharing and learning enabled employees to acquire knowledge and skills, and replenish creativity, imagination, exploration, discovery, and intentional risk-taking. Senge (1990) stated that teams were the fundamental learning units. Team learning commenced with dialogue which was the ability of team members to suspend assumptions, and

judgment and enter into a free flowing dialogue. The free flow of dialogue allowed different ideas to be explored together. Nonaka and Takeuchi (1995) believed that there was a need for a team to establish team proximity and ongoing relationships because team members shared their tacit knowledge through both dialogues and activities. Team learning also created an essential skill for team members to focus on shared vision of organizational strategy more than individual mindset.

Scarbrough and Carter (2000) stated that individually created knowledge and collective knowledge were embedded in the community of people who shared the common dedication to specific work practice. Hislop (2002) agreed that knowledge sharing depended on workers' levels of willingness to share their individual information with others and the feeling of willingness came from the perception of fairness. Wang, Ying, Jiang, and Klein (2006) conducted empirical research on the implementation of ERP systems. The research showed that the willingness of team members to participate created team cohesion in terms of goals, commitment, and ability to work toward the completion of the new systems which led to the successful implementation of the project. The willingness to participate was a source of team cohesion. MacNeil (2003) found that commitment, perception of equity, and trust were barriers to knowledge sharing in organizations. Leana and Van Buren (1999) stated that within the organizational culture that promoted learning and knowledge sharing through management support, this scenario was more likely to generate the trust that individual efforts benefited the team directly and also benefited the individual indirectly. In the process of product development, the process required information from different functional units, and the exchange of information was crucial and essential for generating successful outcomes (Ozer, 2006).

Without sharing knowledge among team members, cross-functionality was ineffective (Mohamed, Stankosky, & Murray, 2004). When implementing of cross-functional team, it was expected that an organization would have a flattened organizational structure which minimized functional boundaries and provided open channels for exchanging ideas and sharing knowledge. Song and Parry (1997) found that, cross-functional cooperation was required for a successful new product development process because the cross-functional team allowed the three functional teams to share their perceptions. Hong, William, Abraham, and Li (2004) proved that shared

knowledge had a positive effect for new product development performance. The research findings showed that sharing knowledge of customers, suppliers, and international capabilities was positively related to the new product development process. Within cross-functional teams, teams involved and collaborating with people from various functions and entities resulted in a blend of individual backgrounds, behavioral patterns, awareness, and tacit knowledge. This environment gradually pushed the organization into the position of holistic system thinking in which team members envisioned the whole interacting system rather than focusing on isolated elements (Mohamed, Stankosky, & Murray, 2004, p. 132). Lin (2007) found that enjoyment in helping others, knowledge self-efficacy, and top management support were influential factors for the knowledge sharing process. The research findings also indicated that employee willingness to both donate and collect knowledge enabled the firm to improve its innovative capability. Wu, Hsu, and Yeh (2007) supported this position and suggested that affect-based trust could promote both team knowledge sharing and learning intensity. Therefore, a team leader needed to create an affect-based trust environment within a team in order to create motivation for sharing and learning.

2.2.5.12 Team conflict

De Dreu and Beersma (2005) focused on conflict management strategies in relation to individual and work-team effectiveness and productivity (De Dreu & Beersma, 2005). There were some unexpected and undeniable effects from the teamwork concept, apart from increases in productivity and efficiency. Teamwork also generated negative experiences and effects on team-oriented organizational structure. For example, the lower rate of productivity, poorer decision-making quality, and increase of employees' dissatisfaction were negative results which had been experienced by some organizations (Appelbaum, Abdallah, & Shapiro, 1999). Shum (1997) presented the idea that the diversity of team members from cross-functional team members who had different backgrounds, assumptions and agendas created extremely creative teams; however, there were some consequences such as inevitable conflict, debate, and negotiation because conflict was inherent within the nature of teams and conflict was a key factor which determined the team's success. Therefore, it was crucial to manage conflict within teams. Kolb and Putnam (1992) argued that "conflict existed

when there were real or perceived differences that arouse the specific circumstances that caused danger to emotion as a consequence" (Kolb & Putnam, 1992, p.312). The scarcity of resource created blocking of behavior. Therefore, when one party blocked the goals or interests of other parties, a state of conflict existed (Robbins, 1994, p.169). Yeh and Chou (2005) posited that task and relational conflict were found to have negatively associated with team performance.

Langfred (2007) proposed and found that members of a self-managing team had unintentionally restructured themselves ineffectively in response to conflict. The findings showed that team conflicts increased because of lower intrateam trust. This problem had an influence on team structure by reducing individual autonomy and loosening task interdependence in the team. Research showed that managers spent 20% of their time dealing with conflict or trying to avoid conflict. The research showed that two kinds of models had been used for managing conflict: structural models and process models. The structural models focused on the factors that influenced behavior and conflict process. This model emphasized internal structures and personalities of conflicting parties. The process models concerned the dynamic of conflict and sequence of events during conflict occurrence. The process models paid more attention to the mental and behavioral reactions of participants rather than their personality traits (Drenth, Thierry, J., & De Wolf, 1984, p.252). Sessa (1996) noted that working in a team environment easily raised conflict because individual team members had different ideas and perspectives. Conflict was a central element that allowed team decision effectiveness if it was managed carefully and effectively (Sessa, 1996) . In addition, findings showed that conflict was a natural consequence of teamwork due to different attitudes of the team members. Therefore, the goal was not reduction of conflict but ensuring that conflict contributed benefits (Sessa, 1996).

In the team decision-making process, conflict was categorized into two types: cognitive and affective. Cognitive conflict focused on difference in decisions, for example, the debate between all team members and individual team members who defended their own perspective. Affective conflict was known as conflict aimed at a person rather than issues under discussion. Affective conflict generated poor and unacceptable decisions. Amason (1996) found that cognitive conflict improved decision quality; in contrast, affective conflict had a negative effect on decision

quality. Cognitive conflict improved decision quality because divergent opinions were sought and considered. However, the cognitive conflict also created a weakening consensus of decision-making. Conflict generated both advantages and disadvantages toward team decision-making.

Discussing the advantages of conflict on team decision-making, Harrison, Thompson, Amason, and Hochwarter (1995) stated that the functional outcomes were generated from cognitive conflicts because team members had an opportunity to examine, compare, and reconcile differences of opinions and perspectives. Therefore, cognitive conflict was the central key for high quality solutions and team effectiveness because team members focused on and paid close attention to team activities. The other benefit of cognitive conflict was that cognitive conflicts assisted team members to reach a consensus in their final decisions. Furthermore, the generation of open communication during team meeting teams generated alternatives; cognitive conflict also promoted and encouraged innovative thinking and creative solutions. One of the most important benefits of conflict was that once the consensus had been reached, team members tended to buy into the decisions. This team's decisions were easier to implement than individual or departmental or organizational action plans (Harrison, Thompson, Amason, & Hochwarter, 1995).

On the other hand, conflict also created some disadvantages for team decision-making. Harrison et al. (1995) mentioned that cognitive conflicts needed to be well managed. If team members had no ability to manage cognitive conflict, then they had a high possibility of facing hostility, distrust, cynicism, and apathy among themselves. Teams with affective conflicts had less opportunity to engage in team discussion which was necessary to generate and synthesize different perspectives. In some cases, team members with affective conflict tended to withdraw from team activities which were crucial for team effectiveness. As a result, teams lost creativity and the quality of team discussions. In addition, team members had less commitment to team decisions (Harrison, Thompson, Amason, & Hochwarter, 1995). A recent study by Lira, Ripoll, Peiro, and Gonzalez, (2007) confirmed that task conflicts were negatively related to work outcomes, which was similar to the previous work by (Thatcher, Jehn, & Zanutto, 2003) and (De Dreu & Weingart, 2003).

More recent conflict research studies have focused on the other side of conflict issues, for example, job satisfaction, organizational commitment, turnover intentions, and individual health and well-being (De Dreu & Beersma, 2005). The relation between conflict and well-being was investigated and it was found that conflict at work created organizational stress and caused reduction of well-being (Dijkstra, Van Dierendonck, & Evers, 2005). Giebels and Janssen (2005) suggested that an organization needed a third party as a successful conflict management strategy in order to prevent the negative outcomes of interpersonal conflict. The negative outcome of interpersonal conflict in an organization was positively related to emotional exhaustion, absenteeism, and turnover intention. Organization relationship conflict was found to have a relationship with job satisfaction and well-being. Task conflict was negatively related to job satisfaction and well-being (Guerra, Martinez, Munduate, & Medina, 2005).

2.2.5.13 Team commitment

In the context of commitment, Gilder (2003) investigated the issues of trust, commitment, and work behavior between contingent and core employees. The research findings showed that the status of employees had an effect on the affective commitment to their team. The contingent employees showed less constructive and more destructive behavior toward team and organization. Reflecting that an employee's status had an influence on the level of the employee's commitment. Chorev and Anderson (2006) identified the commitment of the core team as one of the most critical success factors in a new high-tech venture in Israel. Chowdhury (2005) found that team-level cognitive comprehensiveness and team commitment had a significant positive influence on entrepreneurial team effectiveness. Surprisingly, demographic diversity such as gender, age, and functional background did not contribute and influence either team-level cognitive comprehensiveness or team commitment. Zaccaro and Dobbins (1989) posited that members became more committed to the team as they increased their linking to the team, its particular activities and fellow team members. McDonoughhill (2000) suggested that commitment to and ownership of the project contributed to team success.

Bishop, Scott, and Burroughs (2000) found that job performance was related to team commitment and the relationship between perceived team support and team commitment. Insight into the support-performance relationship was found within this study. The research finding noted that support emanating from the work team (PTS) was related to job performance and this relationship was mediated by team commitment. The significant path between team commitment and job performance suggested that commitment was related to performance when the focus of commitment had more immediate significant effect on the success of the object of commitment. Aube and Rousseau (2005) confirmed that team goal commitment was found to have a positive relationship with team performance, quality of group experience, and team viability.

Park and Henkin (2005) investigated the other type of commitment. The authors studied the relationship of teacher team commitment and teamwork. The results showed that teamwork was a significant predictor for team commitment and the subscale of teamwork which included team orientation. Team leadership and backup behavior were also significant predictors of team commitment. Teachers who had higher level of teamwork skill, team leadership, team orientation, and backup behavior also perceived a higher level of team commitment. Natale, Libertella, and Rothschild (1995) stated that to create commitment for effective team management, managers needed to develop a paradigm shift. The paradigm shift was the process of creating a new corporate mindset and multicultural workforce. Managers needed to assist multicultural teams to confront different attitudes, values, behavior, experience, backgrounds and expectations with respect.

Wilson (1996) believed that the team leader made team members committed. The leader needed to provide members with three elements: direction, resources, and support. Wang, Ying, Jiang, and Klein (2006) found that commitment to learning had a positive relationship with team cohesion, and the team cohesion assisted team members to achieve the success of the new project implementation.

2.2.5.14 Team management support

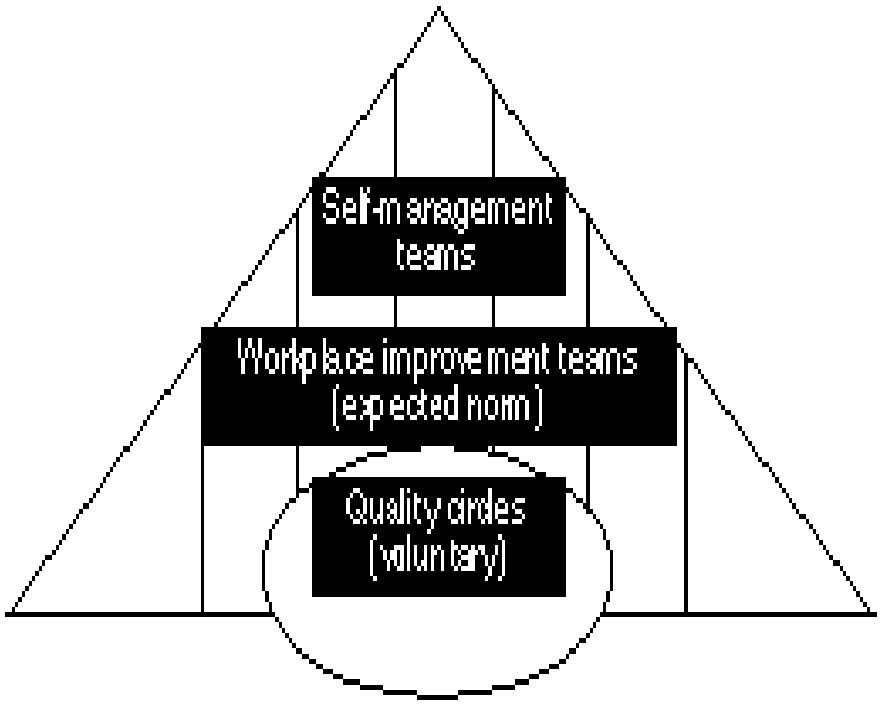
Management support was a vital part for team performance as Clifford and Sohal (1998) argued that total commitment for support from senior management was essential for completion of a self-directed transition process. Many previous research studies found that top management support had a positive impact on the success of new products or project development (Cooper, 1999; Ozer, 2004; Parry & Song, 1993; Song & Parry, 1997). Recent research conducted by Song and Noh (2006) and Jeong, Pae, and Zhou (2006) confirmed that top management support was a key distinguisher between success and failure and a critical factor in effective management of product innovation. Within cross-functional teams, in order to bring people to work together, top management needed to promote cross-functional relations that brought people together and rewarded team members for taking shared responsibilities and corrective actions or reaching mutually valuable solutions. Moreover, managements were expected to stay away from meddling and controlling mechanisms and, at the same time, managements needed to foster the team learning environment and encourage team members to experiment without punishment (Mohamed, Stankosky, & Murray, 2004). Top management team support and recognition had been found to have a direct positive effect on team performance (Clark & Fujimoto, 1991; Scott, 1997). McDonoughill (2000) mentioned that team leadership was the most frequently mentioned as an enabling factor in achieving success. Ragu-Nathan, Apigian, Ragu-Nathan, and Tu (2004) studied the effect of top management team support in information systems. They stated that top management support was a significant factor in influencing the effectiveness of information systems in an organization. Toe and Ang (2001) confirmed that the lack of support from top management was a major problem that a majority of organizations confronted during the planning, development and usage of IS. Sohal, Moss, and Ng (2001) identified that the lack of top management support was the significant impedimental factor to IT success. Law and Ngai (Law & Ngai, 2007) found that a high level of senior management support had a positive impact on ERP and BPI success.

2.2.6 Comparison between self-managed teams, corrective action teams, and process improvement teams

Atkinson (1997) explained how organizations transformed into the "Total teamwork way." He explained that at the beginning stage, voluntary improvement activities needed to be encouraged and established in order to open the door for the development of team ownership in the workplace. Management actively enlightened and supported the degree of involvement and improvement as the norm in the work place. It became the expectation rather than the exception. Once the norm was established, the evolution and development moved progressively into self-supervision as self-management teams. This was the basic foundation of the total teamwork way which is shown in Figure 2.8.

Figure 2.8:

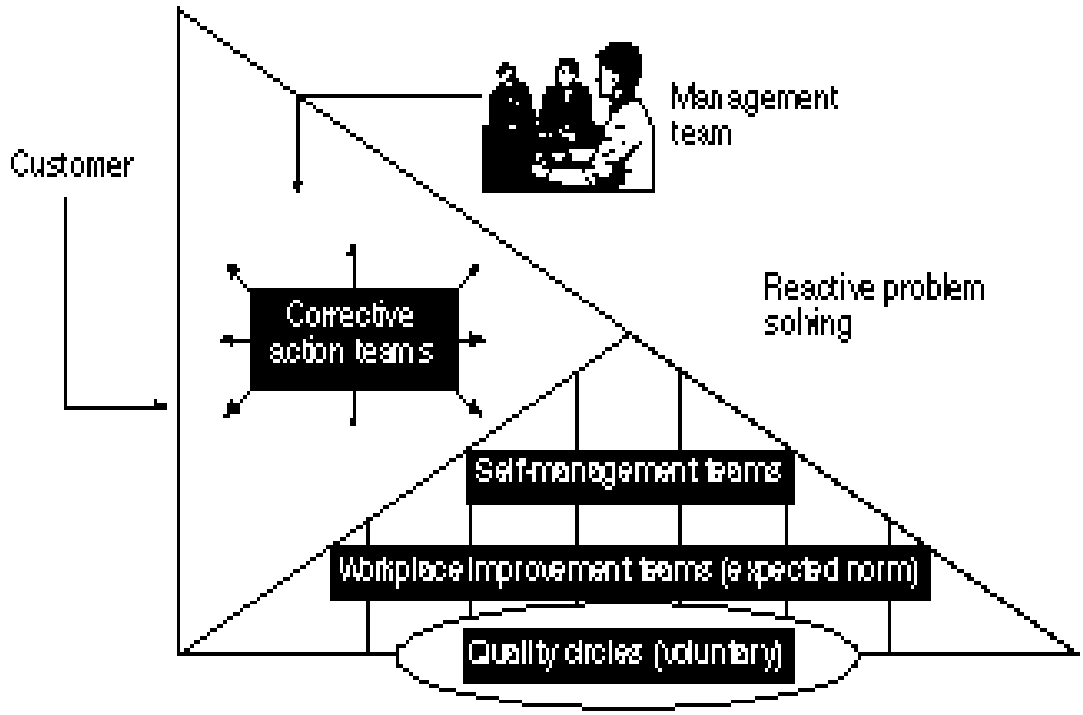
A triangle encapsulates all the workplace teams at every level



Source: (Atkinson, 1997, p. 117)

Once the foundation had been laid, the additional team was added into the model. The corrective action teams or task forces were added into the model in order to solve problems based on team members' expertise and specialization. With the variety of knowledge covered and provided by team members, the problem-solving became an efficient operation. After the completion of problem-solving, team members were disbanded. The main objectives for this team were reacting and remedying the identified problems and ensuring the systems were working problem-free. The supportive triangle of the corrective action team is shown in Figure 2.9.

Figure 2.9:
The supportive triangle of the corrective action team



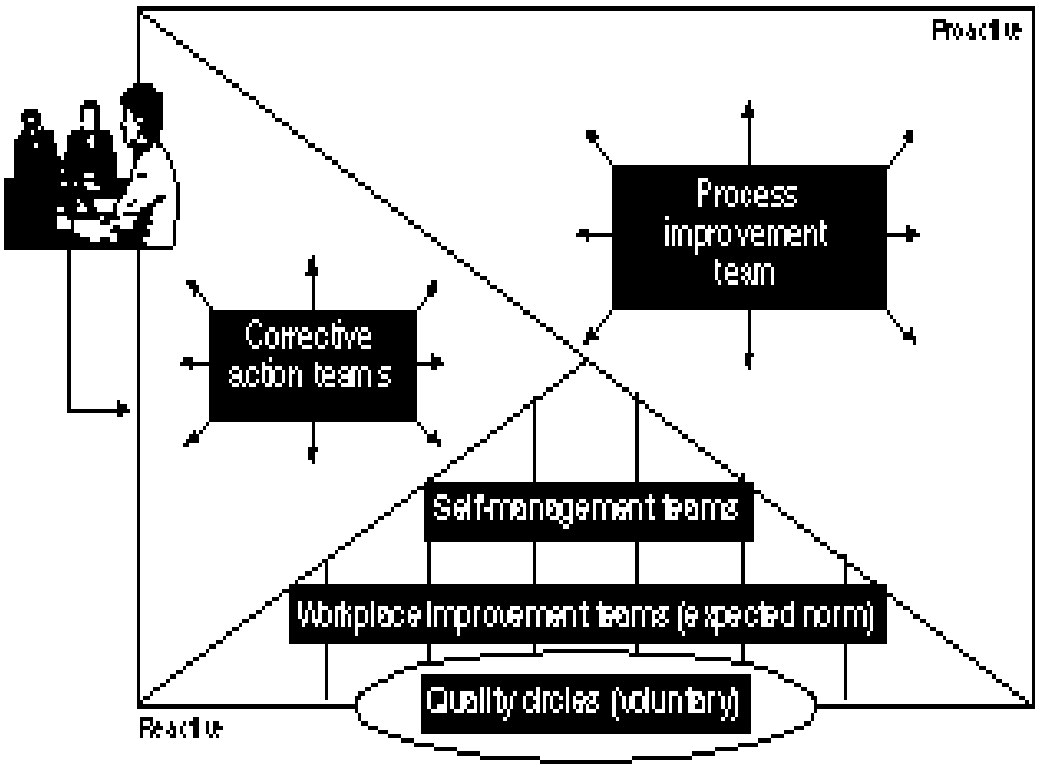
Source: (Atkinson, 1997, p. 118)

The final additional team was the process improvement team. The main objective of this team focused on changing the existing operation, which was even better than achieving problem-free operation. This team is called a process improvement or proactive team. This team searched for process improvement. Its working philosophy was "there was a better way to do anything". It was time to add and introduce technology experts into the process improvement team. The job responsibilities for

this team were to understand the current processes and seek for improvement by merging, eliminating, or redesigning the existing processes. The process improvement team completed the total teamwork way which is presented in Figure 2.10.

Atkinson demonstrated how teams developed from the entry level and gradually developed into the total teamwork way. Atkinson (1997) suggested there was logical link and development from the basic quality management operated and performed by an individual employee or within a department. In some circumstances, problems were broad in scope and overlapped the other departments. The problems became cross-functional problems which needed cooperation from several departments in order to solve and operate a problem-free operational process. The ultimate process was not just problem-free; it was improved in order to create better and more effective and efficient operational processes. Therefore, there was a need for a process improvement team to redesign the existing operational processes.

Figure 2.10:
Proactive improvement team



Source: (Atkinson, 1997, p. 119)

The next section presents and discusses the next associated area of this study which is process improvement. Drawing on the process improvement literature, the foundation of process improvement and its definition are presented. Then two types of process improvement are identified. These are nonIT-driven process improvement and IT-driven process improvement projects.

2.3 Process Improvement

Basically, the term process improvement (PI) emerged in and has been widely used since the early 1990s. However, process improvement was influenced by two main management movements: total quality management (TQM) or quality circle (QC), and business process reengineering (BPR). Quality circle was first introduced in Japanese manufacturing in the early 1960s by a team of workers who attempted to identify and develop solutions for improved quality of products. Quality circle was the early version of total quality management which was widely adopted in the 1980s (Deming, 1986). Business process reengineering (BPR) emphasized the radical improvement of business process where a redesigned process and information system were a significant influence on redesign implementation (Hammer, 1990). The main distinguishers between total quality management and business process reengineering were that TQM focused on incremental improvement, while BPR searched for radical improvement; TQM utilized internal resources, while BPR adopted external resources in the form of consulting; and TQM had a permanent team structure while BPR teams were usually temporary (Davenport, 1993; Hutchins, 1985). However, process improvement shared some characteristics with the two main management movements. Process improvement involved small to large change improvement and comprised teams ranging from 3 to 20 team members (Kock & McQueen, 1995, , 1997a).

2.3.1 What is process improvement?

Since the 1990s, many organizations have implemented or raced to implement business process improvement in order to reduce wasted time, resources, quantity, and significant defects. Process improvement was viewed as the implementation of a deliberate change in the way of doing business in order to achieve operational excellence, quality of output, and business performance (Liu, 2006). Some of the best-

known process improvement methodologies were International Organizational Standardization (ISO) 9000, Total Quality Management (TQM), and Six Sigma (Liu, 2006, p. 43).

Every organization had a network of processes and all work was accomplished through a process and every process had inputs; the outputs were the result of the process (Hindle, 1997b). Therefore, there were no products and services without process. What was a process? In order to understand process, the following terminologies need to be understood. **Process** is an activity or a team of activities that converts inputs while adding value into products or services and provides outputs that the customer needs (Harrington, 1991). **Business process** has been defined as sets of interrelated activities or work flow (Harrington, 1991). Kock, McQueen, and Corner (1997) defined business process as

> comprising the functions (carried out by organizational staff) and tools involved in the execution of the activities in a process. Moreover, the business process can be seen as comprising the product flow between activities, and the suppliers and customers of the process. (Kock, McQueen, & Corner, 1997, p. 72)

Business process is a set of logical related tasks in which organizations utilized their resources to achieve a defined business outcome (Davenport & Short, 1990). However, in the literature, the terms business process reengineering (Hammer & Champy, 1993), process improvement (Harrington, 1991), process innovation (Davenport, 1993), and business process redesign (Davenport & Short, 1990) were used interchangeably to represent the phenomenon of " business process change" (Kettinger & Grover, 1995). **Improvement of process** refers to changing a process to make it more effective, efficient, and adaptable (Harrington, 1991).

In order to improve process, Harrington (1991) suggested that organizations needed an emphasis on process rather than on organizational structure. Harrington (1991) also distinguished between organizational focus and process focus, as shown in Table 2.2.

Table 2.2:

Harrington's differences between organizational and process focuses

Organizational focus	Process focus
Employees are the problem	The process is the problem
Employees	People
Doing my job	Help to get things done
Understanding my job	Knowing how my job fits into the total process
Measuring individuals	Measuring the process
Can always find a better employee	Change the process
Motivate people	Remove barriers
Controlling employees	Developing people
Don't trust anyone	We are all in this together
Who made the error?	What allowed the error to occur?
Correct errors	Reducing variation
Bottom-line driven	Customer driven

Source: (Harrington, 1991, p. 5)

Business process improvement was "a systematic methodology developed to help an organization make significant advances in the way its business process operated . . . It attacks and focuses on eliminating waste and bureaucracy" (Harrington, 1991, p.20-21). Business process is concerned with achieving three main objectives: making process effective: producing the desired results; making process efficient: minimizing the resources used; and making process adaptable: being able to adapt to customer and business needs (Harrington, 1991, p 15).

There were a number of fine reasons for focusing on the business process or process improvement. Harrington (1991) argued organizations benefited from focusing on business process improvement because business process improvement enabled organizations to focus on the customer, allowed the organization to predict and control change, enhanced organizational ability to compete by utilizing available resources, promoted good interrelationships, provided a systematic view of organizational activities, kept a focus on the process, prevented error from occurring,

explained how inputs become outputs, and provided a view of how error occurred and a solution to correct it (Harrington, 1991, p.16).

Harrington's five phases for business process improvement were Phase 1: organizing for improvement - to ensure success by building leadership, understanding, and commitment; Phase 2: understanding the process - to understand all dimensions of the current business process; Phase 3: streamlining - to improve the efficiency, effectiveness, and adaptability of the business process; Phase 4: measurements and controls - to implement a system to control the process for ongoing improvement; and Phase 5: continuous improvement - to implement a continuous improvement process (Harrington, 1991, p. 21-23).

Juran (1989) summarized process improvement as the initiative of eliminating waste, for example, scrap, rework, returned goods, cost of warranties, settling customer claims, and other redundant activities. According to Crosby, Deming and Juran, process improvement was organized into three broad categories of defect prevention, improvement actions, and cost of quality deficiencies. Defect prevention referred to avoiding making mistakes in the first place. The ideal situation was zero defects which emphasized error reduction. Improvement actions attempted a continual upgrading of the quality standard of business processes for achieving process improvement. Cost of deficiency was concerned about reducing of excess cost in manufacturing a product or offering a service; the aim was to reduce waste (Crosby, 1979; Deming, 1986; Juran, 1992).

During the decade from 1999, academic researchers attempted to identify the inhibitors and enablers to sustain process improvement. Rich and Bateman (2003) identified lack of resources, lack of focus on process improvement, the need for change, management support, employee turnover, and measurement system. In terms of enabler factors, the research findings identified the availability of resources, general culture (positive people, open-minded culture, and enthusiasm), process improvement champion, leadership, and effective communication. Bateman (2005) found generic enablers for the sustainability process improvement. The generic enablers for sustained process improvement were achieved through 5C; clear out; clean and check; configure; conformity; and custom and practice (Bateman, 2005).

The Six Sigma programs aimed to eliminate defects from every product, process, and transaction. Cross-functional process management was employed as the core of Six Sigma's success for eliminating rework created by disconnects and miscommunications. One interesting facet of Six Sigma was to begin fresh when redesigning a process and recognizing improvement even it was a small improvement because it was an essential part of the whole business process's success (Liu, 2006).

2.3.2 Process improvement driven by noninformation technology

Some process improvement projects were completed and achieved without the utilization of information technology. The previous research showed that there were several ways to achieve process improvement. For process improvement, some projects adopted integrated multidimensional methodology, utilized information, implemented zero defect, introduced teamwork, and utilized other techniques. The following sections present the prior research based on noninformation technology used in process improvement.

2.3.2.1 Integrated multidimensional methodology for process improvement

McAdam (1996) suggested that there was a need to integrate several business improvement initiatives, tools, and techniques that were associated and overlapped with the concept of total quality program for process improvement practices. However, the integrated business improvement methodology needed to remain focused on business needs and make the best use of scarce resources. McAdam integrated several techniques such as benchmarking (Camp, 1995), business process improvement (Harrington, 1991), and mapping, measures, and process evaluation (Hutchins, 1993). McAdam proposed the four-phase methodology for business process improvement. The four phases were Phase 1: Identify the critical process improvement; Phase 2: Analyze the current process; Phase 3: Improve the process; and Phase 4: Implement the improved process (McAdam, 1996, p. 66-70). McAdam believed that the integrated methodology became more effective than individual initiative as part of the overall total quality programs. This process-based approach

not only improved customer focus but also avoided the limitations of the functional approach.

ISO 9000 and the TQM Award Model were the two well-known quality frameworks which had a similarity in focusing on process management (Porter & Tanner, 1996). Bendell (2005) reviewed the strength and weakness of process variation reduction (Six Sigma), process waste reduction (Lean), process error reduction (Poka-Yoke), and basic business process improvement (Process mapping) and attempted to identify the common and distinct features and topologies. SITA (*Societé Internationale dé Telecommunications Aeronautiques*) integrated ISO 9000, BPI and TQM in order to achieve process improvement. The research findings showed that ISO 9000 was a milestone of continuous process improvement which was a component of TQM. The process improvement increased departmental and individual efficiency while ISO 9000 provided competitive advantages for SITA.

Povey (1998) reviewed and compared 10 business process improvement methodologies and posited that all methodologies were mechanistic in nature and none of them paid attention to people involvement, except Checkland's (1981) soft system methodology (SSM). Povey argued that many methodologies failed to address the human aspect, acknowledge the change of the project, and utilize the power of benchmarking for the most appropriate point for improvement methodology. He proposed the "best of breed" process improvement methodology which selected, combined, and blended the best parts of the other methodologies. He highlighted the areas of top management's support, staff training, participation of process improvement teams, perspectives of technical aspect and human aspect, continuous improvement, and consideration of change regarding human aspects.

At Thales Naval in Netherlands, the organization integrated the capability maturity model (CMM) and ISO9001 to achieve process improvement. The objective was to utilize the best of both process improvement approaches to achieve the process improvement and business goal orientation (Trienekens, Kusters, Rendering, & Stokla, 2005).

Amaratunga, Baldry, and Sarshar (2001) adopted the balanced scorecard from Kaplan and Norton (1996). They believed that the processes of organizations could be best viewed by taking a balanced view across a range of performance measurements. The balanced scorecard provided organizations and employees with the vision, strategies, critical success factors, development and identification of measures and cause-and-effect relationships, and action plans. Even though the concept of balanced scorecard did not guarantee the success of strategies and vision, it did provide an effective way to express an organization's strategies and vision in tangible terms in order to get support from its members. Olve, Roy, and Wetter (1999) suggested that balanced scorecard supported process improvement. Balanced scorecard, process mapping and scoring system were integrated to develop a priorities process for improvement. This structured approach to process improvement had five steps: derive the critical success factors, perform process mapping, identify process for improvement, redesign process, and measure performance. This process improvement demonstrated the in-house tools and techniques of UK police process improvement (Greasley, 2005). Business process reengineering (BPR), continuous process improvement (CPI), and business process benchmarking (BPB) were integrated by Lee and Chuah (2001) who argued that some specific processes needed extra time to work and justify themselves. The researchers proposed an integrated methodology called SUPER methodology which was a three-in-one approach. SUPER integrated some key activities from three individual improvement methodologies. The researchers posited that the successful implementation of SUPER methodology came from the right mix and size of a typical PIT. A PIT team had six members and included senior and middle management level for different functional areas; each member had different involvement directly and indirectly in BPT project. This establishment of the team allowed different experiences and perspectives to be assembled and provided a better communication channel.

Adesola and Baines (2005) proposed model-based and integrated process improvement (MIPI). This methodology was to understand business needs, understand the process, model and analyze process, redesign process, implement new process, assess new process and methodology, and review process. The goal of this methodology was to guide a project in the improvement of a business process. The authors believed that this model created not only a holistic and procedural

methodology for business process improvement but also achieved the assessment criteria of feasibility, usability, and usefulness.

In 2006, Jeong, Kagioglou, and Siriwardena developed a process improvement model for construction enterprises. The researchers proposed a structured process improvement model for construction enterprises (SPICE). The purpose for this model was to develop a set of key processes to establish an essential managerial infrastructure for achieving organization-wide process improvement. SPICE encompassed four key processes: process definition, process customization, process training, and process improvement resources. The researchers identified commitment, ability, activity, evaluation, and verification as the enablers of the SPICE model (Jeong, Kagioglou, & Siriwardena, 2006).

2.3.2.2 Information utilization for process improvement

Information is one source of the key success factors for process improvement. Davenport and Beers (1995) found that the key aspect of success for process improvement was effective information management regarding process performance. Kock and McQueen (1996) analyzed product flow in terms of breadth and complexity of business process by using the graphic model of flow charting tool. The research implications suggested that practitioners needed to pay more attention to information flow analysis and redesign because business processes tended to cut across fewer internal departments and functions and organizations moved toward specialization. Therefore, organizations needed to focus on core competencies because there was a shift in process-related information.

Hindle (1997a) agreed that information needed to be at the forefront of improvement strategies. The author suggested information needed to be addressed as a key resource for improving performance, information flowing both horizontally and vertically, each individual having access to the majority of information, decisions always being based on informed judgment, everybody seeing information management as part of their role, sharing information in building effective working relationships being valued, and aligning with business, information, and human resource strategies (Hindle, 1997a, p. 185).

Information is everyone's business. Decisions are supported by information, and information is an integral part of the business process. Historical data is another type of information that could be used for process improvement. Lee, Min, Han, Chang, and Choi (2004) used a large amount of historical data and statistical analysis methods to identify the key factors that significantly affected the performance of hot stove systems. The research findings showed significant improvement in the operating conditions of the hot stove systems.

2.3.2.3 Zero defect for process improvement

Fisher (1999) reported that Japanese manufacturing adopted the concept of zero defect and the techniques of Poka-Yoke for process improvement. The main objective was to remove the causes of defect by mistake-proofing. The technique of Poka-Yoke was a mechanism that either prevents a mistake or defect occurring or makes any mistake or defect obvious at a glance. This was simple and inexpensive inspection of each item to determine that items passed the quality threshold. The goal of Poka-Yoke was to engineer the process; therefore, mistakes were prevented or immediately detected and corrected by introducing the new working procedures. Six Sigma's immediate goal was defect reduction because reduced defects yielded improvement and higher yields improved customer satisfaction (Raisinghani, Ette, Pierce, Cannon, & Daripaly, 2005).

2.3.2.4 Teamwork in process improvement project

There was evidence from process improvement in project expandion in the oil industry. Teamwork was introduced as an alternative option for process improvement. Willoughby (2005) collected suggestions from professions within the oil and gas industry. It was clear that by involving more teamwork in the project, the process was improved. The teamwork concept was tested to improve and solve the poor communication problems. The research findings suggested that when effective teamwork was involved, the problems of poor communications were alleviated. Jones (1994) argued that the traditional function- or department-based approaches to process improvement had failed to achieve the required gain in overall business performance because traditional approaches had seen process as achieving departmental objectives while the cross-functional approach focused on customers. The cross-functional

approach to process management and improvement provided significant opportunities for improving business process and performance. The cross-functional approach was adopted by worldclass organizations such as Unisys, IBM, Ford, and British Telecom. Hindle (1997b) argued that cross-functional process was an area in which considerable improvement could be made. Hindle demonstrated this and compared performances between interfunctional business process and cross-functional process. However, business process improvement needed top management commitment and involvement because without top management involvement to provide authority and influence on change, it was difficult to change the existing norms. The comparison of performance between interfunctional business process and cross-functional process is shown in Table 2.3.

Table 2.3:
Hindle's different performances between interfunctional business process and cross-functional process

Interfunctional business process	**Cross-functional process**
Accidents	Reduce cycle time
Duplication of effort	Delete or combine activities
Delays and inconsistencies	Reduce re-work
Late, incomplete or error-prone services	Ensure adequate feedback to or from process operator
Inefficient communication	Apply special handling for special cases
External "customer" complaints	Improve information and material flows
Inefficient and bureaucratic controls	Ensure full satisfaction of customer's needs
Lost information requiring re-work	Apply effective and efficient controls
Slow response to recruitment/ deployment needs	Identify opportunities for redeployment in value-added activities

Source: (Hindle, 1997b, p. 182-183)

Watson (1998) identified that the creation of a process improvement team through self-directed teams at Tracor Aerospace achieved several significant organizational

improvements. Watson reported that the management team was dedicated to a total quality management and continuous improvement philosophy which targeted the elimination of defects, reduction of cycle time, and increased customer satisfaction. As a result, there was a significant outcome of a 75% decrease of cost per unit from improved quality and defect elimination. Tracor was listed as a Gold Level Supplier on the MDA Quality and Delivery Reports for several years.

Hayes and Helms (1999) agreed that teamwork approach, information systems, organizational structure redesign, and top management support were critical for process improvement. Teams of a small size worked more effectively than large-sized teams, especially when the team includes a member from the information technology department. Team members coming from all departments provided ability for team members to understand the true work process. Information systems allowed staff from different departments to follow, monitor, report automatically to the manager. IT was the information systems that improved reporting and communication among different departments. In some cases, a redesign of the operational process was needed in order to eliminate bottlenecks and generate a better flow of process. However, staff needed to be empowered to make appropriate decisions to meet customer requests. The authors concluded that the main benefits of using a team approach for process improvement were departmental cooperation with no conflict and negative effect on the other parts of the process; all departments understood the other department's decision-making which made the overall process operate more efficiently. Working together as a team allowed team members to communicate across departments; there was open communication throughout the entire operational process. The other benefit derived from working as a team was that team members learned and understood the whole process. However, the key success factor for a successful process improvement team was management support.

Holt, Love, and Nesan (2000) believed that empowerment was one of the methods for process improvement because people and process were significantly related; therefore, both people and process required simultaneous and adequate improvement. Process improvement was governed and determined by people. Every employee had significant potential to improve not only his/her own process, but also improve others because the poor performance of one individual influenced and impeded improvement

of others. The concept of empowerment gave employees great control and freedom to generate self-responsibility and self-efficacy. Nesan and Holt (1999) agreed that the empowerment improved business process, reduced costs, and improved product quality. Howard, Foster, and Shannon (2005) revealed that their research findings showed that the team climate had an influence on performance outcomes of process improvement, perceived customer satisfaction, and employee satisfaction. The effectiveness of teams in process improvement was influenced by soft control such as norm and social pressures.

2.3.2.5 Other techniques for process improvement

Wolff and Pett (2006) found that organizational internationalization and innovative position had a positive impact on new product and process improvement. Surprisingly, product improvement orientation showed positive association with growth and, in turn, profitability, whereas the process improvement showed no statistical relationship to growth and, ultimately, profitability. Continuous improvement, reengineering, and benchmarking appeared many times in literature as process improvement techniques or methods. Lok, Hung, Walsh, Wang, and Crawford (2005) attempted to find the organizational enabling factors that were program-specific enablers of success. The findings showed that reengineering delivered the greatest impact on performance; executive commitment was needed to make process improvement happen; strategic alliance was the influential factor on the success rate of reengineering and continuous improvement programs; and employee empowerment was necessary for each program to work successfully. Kumar (2005) investigated the impact of service improvement on customers' waiting experiences in a retail store. The result indicated that the impact of service improvement initiative reduced waiting time. King (2005) argued that user involvement was a key for IS development process improvement because development process improvement was a higher-level activity than application development. Users had more direct knowledge of what was needed in applications systems than they had in development process.

2.3.3 Process improvement driven by information technology

The importance and popularity of information systems over the last two decades has seen information system (IS) integration take on a significant role in business process improvement (BPI). Information systems in business process improvement became the subject of interest among academic researchers (Boar, 1993; Madnick, 1991). Venkatraman (1991) reported that there were extensive uses of information technology such as shared-databases and networks to eliminate repetitive activities, prevent errors, reduce cycle time in product and service development, and improve customers' expectation in products and services. Mirani and Lederer (1998) reported that IT had a positive effect on business process and customer focus which was similar to previous research conducted by Mukhopadhyay, Kekre, and Kalathur (1995). These authors found IT had a positive impact on process improvement. It was clear that information technology and information systems were involved in business process improvement. In addition, the widespread internal use of Internet-based technologies like intranets and extranets substantially improved information sharing and collaboration within business and between business partners (O'Brien & Marakas, 2006)

2.3.3.1 Implementation of information technology, information systems, and Internet technology for process improvement

There are several tools and techniques to achieve process improvement. In terms of information technology, systems and Internet technology, electronic data interchange (EDI), electronic fund transfer (EFT), automatic transaction machines (ATMs), information and communication technology (ICT) are some forms of systems that have been used to improve organizational performance and expand organizational products and services (Bhatt, 2001). Bhatt (2001) studied the relationship between business process improvement and electronic data interchange. His findings showed that EDI had a significant impact on internal process improvement by enabling an organization to streamline its internal work processes in order to meet shifting customer demands and provide timely responses to customer inquiries.

Mann and Voss (2000) demonstrated how an innovative process improvement was established by integrating ISO 9000 and the TQM Award Model (the Baldrige criteria which was equivalent to the European business excellence framework and TQM Award Model). PEC (New Zealand) Limited utilized the Lotus Notes-based Process Improvement Request (PIR) system as an enabling tool for all members from cross-functional teams who came from three business units to activate a process or management system review or make suggestions for improvement with specific timeframe according to business priority based on the Baldrige criteria. By using the Lotus Notes-based PIR system, productivity increased 37 times; 220 improvement projects were managed; and ISO 9001 was achieved and assessed against the Baldrige framework. Since the PIR system was introduced in 1996, more than 3,500 improvement projects have been successfully completed (Mann & Voss, 2000). Hayes and Helms (1999) found that information systems, such as tracking systems, had a significant impact and proved to be very beneficial in improving the overall process in terms of reporting, scheduling, and communication. Jayaram, Vickery, and Droge (2000) reviewed the constitution of information systems and process improvement and they found that in previous research there were 12 practices that constituted an information intensive support system with the use of technology and process improvement tools and techniques. The authors divided information systems for process improvement into two teams. The first team consisted of eight practices which relied on processing information through an information systems support system such as electronic data interchange (EDI), computer-aided design/engineering (CAD/CVE), computer-aided manufacturing, robotics, flexible manufacturing system (FMS), computerized production planning systems, automated materials handling, and automatic data capture. The other four practices focused on tools and techniques to eliminate waste or add value (Jayaram, Vickery, & Droge, 2000, p. 317). The research finding strongly supported the argument that the exploitation of information systems streamlined cycle time performance.

Bhatt (2000) found that the high level of data integration and communication networks integration made significant contributions toward process improvement and customer focus, as was also found by Mirani and Lederer (1998). Emiliani (2000) suggested that the used of Internet technology via online auction assisted a cross-functional online auction team to improve the purchasing process. The downward

price online was simply traditional purchasing aided by new technology which was expected to truly eliminate waste and reduce total cost.

Chan and Spedding (2003) integrated Business Process Reengineering (BPR) and Total Quality Management (TQM) and this integrated approach was expected to deliver and solve the yield management, process control, and cost management problems. This approach adopted and utilized enabling technologies such as information technology and artificial intelligence techniques, and mathematical models for process improvement (Chan & Spedding, 2003).
In the construction industry, information and communication technology (ICT) was utilized for process improvement. Bowden, Door, Thorpe, and Anumba (2006) reported that there was a changing requirement in construction technology and there was an initiative to adopt and implement mobile technologies to improve the electronic flow of information. This initiative was expected to offer the potential of significant improvement in terms of reduction of construction time, cost deficit, accident, waste, and operation. Several organizations showed their enthusiasm for and interest in implementing this initiative; however, not everyone agreed on this initiative.

2.3.3.2 Implementation of teamware for process improvement

Kock and McQueen (1995) introduced asynchronous teamware system in order to improve business process. The qualitative interview data showed that there was a significant improvement in terms of reduction of redundant improvement proposals, perceived higher efficiency in the analysis of business processes, perceived high importance of the business process analysis stage, perceived usefulness of the public access to historical information on former business process improvement, perceived value of faster and easier communication, and perceived importance of the role of the teamware system. One member of one of the business process improvement teams reported that the new structure improved organizational productivity by being able to conduct parallel activities and minimize time spent in comparison with the previous meetings. Both senior executives posited that there was a great satisfaction with the results of the business process improvement teams; they reported that “we have never been through such a successful motivational endeavour since the form was found”

(Kock & McQueen, 1995, p. 26-27). The new structure also promoted good relationships between senior management staff, middle managers, and workers.

Kock and Corner (1997) used a team process methodology called MataProi and an asynchronous teamware tool for process improvement in order to redesign course-related processes at the department level. The research showed that the usage of asynchronous computer mediation required less demand for leadership skills, significant decrease in overall cost, and dramatic decease in the degree of team interaction. The finding showed that asynchronous computer mediation promoted departmental communication.

Kock and McQueen (1997a) found that the asynchronous teamware support had significant influence on process improvement activities for process improvement projects. The research findings showed that email conferencing teamware support increased team process adoption; the researchers found that new behavior existed by using email conferencing teamware support which had not been seen in face-to-face process improvement research, and in previous teamware support research conducted by (Kock & McQueen, 1995). There was an increase of heterogeneity in team members who came from different departments in organizations within process improvement teams. Team duration was decreased by using email conferencing support. Cost for running a process improvement team was decreased. The two significant contributions from using email conferencing support were team effectiveness, team interaction and member contribution length were increased. It was clear that the asynchronous teamware support had significant impacts on process improvement activities (Kock & McQueen, 1997a).

Kock and McQueen (1997b) introduced email conferencing as a tool for teamware support. The research findings showed that email conferencing reduced the physical obstacles of participation from different departments and disruption among different departments during team discussions. In addition, email conferencing also minimized interdepartmental conflicts. Lastly, email conferencing promoted individual learning during process improvement team discussions depending on the complexity of the issues.

Kock, McQueen, and Baker (1996) claimed that process improvement needed to focus on information flow rather than activities, because most of the flow of products such as goods, services, information in a knowledge organization was formed by information. For process improvement, knowledge needed to carry out operations which were decentralized rather than a top down process because management lacked the necessary knowledge to command the improvement. The organization needed to concentrate on knowledge rather than learning capability because learning capability took a long time and high investment while the main asset of successful organizations was either knowledge which was brought in from outside, or knowledge workers. The researchers posited that knowledge was not be created without fragmentation; this referred to the need for managers to understand organizations as systems and co-ordinate the work by using specialized teams of knowledge workers. It was seen that the first two myths were likely to reinforce the failure of re-engineering framework and the last two myths were to the discredit of the learning organization. However, Kock, McQueen, and Corner (1997) found another relationship between process improvement and learning process. They attempted to identify the relationship between business process improvement and the learning organization and focused on the business process as the unit of the study. The research findings showed that, within business process, different functions exchanged materials and data in order to execute activities in business process. The researchers identified that more than 75% of knowledge was exchanged in business process. Within the improvement process, there seem to be more knowledge exchange than core process and supportive process. It was clear that the improvement process fostered the learning organization among different functions and departments. From the research, the conclusion was that process improvement was a powerful tool for knowledge communication and building of shared knowledge among different departments in organizations.

2.4 Systems development

2.4.1 What is systems development?

Systems development was a development of software, hardware, and application in order to perform functional tasks. Laudon and Laudon (2000) stated that systems were developed to increase efficiency and save money; however, systems also became a

vitally important source of competitive advantages. Some organizations developed systems because they were more innovative than others. The external environments were factors that forced organizations to adopt and design information systems. The external factors were cost of labour and/or other resources, competition between existing competitors, and changes in government regulations. Aspects of the internal environment such as norms, values, strategic plans, and performance improvement were factors for developing information systems.

2.4.2 The evolution of systems development

The systems development methodologies were created and widely used during the decade 1967 to 1977. The prototyping approach was labeled as a problem-solving approach for traditional SDLC (Bally, Britton, & Wagner, 1977). The concept of user participation emerged and was well integrated within systems development process. The Taylorist assumption became a force to claim that systems development was problematic because systems were rejected by the end-user. This situation lead to the focus on socio-technical systems which focused on the cooperation between the technical and social aspects of system design (Cherns, 1976). Later on, the systems development process became a more structured approach. The use of documentation alongside systems development became popular and gained wide acceptance. The systems development processes were developed and improved gradually. At the present time, Structured Systems Analysis and Design Methods (SSADM) has become most widely accepted and used in the government sector in the UK (Downs, Clare, & Coe, 1992; Middleton, 1999; Middleton & McCollum, 2001; Woolridge, Morrissey, & Phillips, 2005). However, some researchers believed that object-orientation was the new paradigm for systems development (Thomann, 1994).

Actually, there were several methodologies to develop information systems. Some of these were described by Avison and Fitzgerald (1995) in their information systems development book, for example, Structured Analysis, Design and Implementation of Information Systems (STRADIS), Yourdon Systems Method (YSM), Information Engineering (IE), Structured Systems Analysis and Design Methodologies (SSADM), Merise, Jackson Systems Development (JSD), Object-orientation analysis (OO), Information Systems work and Analysis of Change (ISAC), Effective Technical and

Human Implementations of Computer-based Systems (ETHICS), Soft Systems Methodology (SSM), Multiview, Process Innovation, Rapid Application Development (RAD), KADs, and Euromethod. (For details, see Chapter 6: Methodologies, in Avison & Fitzgerald, (1995). For this research, the researcher focused on and briefly explained three main methodologies that were used widely for systems development. The main focus for this research was the maintenance phase of the systems development process.

Barry and Lang (2003) conducted a survey and examined the 100 main Irish companies and part of the survey showed the method usage in traditional IS development. From the survey, the methods that were used for general IS development are shown in Table 2.4.

Table 2.4:

Incidence of method usage in traditional IS development

Methods	Respondents who have used this method n=65	Percentage
In-house method	37	56.9%
Do not use any method	16	24.6%
Structured Systems Analysis and Design Methodologies (SSADM)	11	16.9%
Rapid Application Development (RAD)	9	13.8%
UML	4	6.2%
Information Engineering (IE)	3	4.6%
Structured Analysis, Design and Implementation of Information Systems (STRADIS)/ Yourdon Systems Method (YSM)	2	3.1%
LBMS Systems Development	2	3.1%
Jackson Systems Development (JSD)	1	1.5%
OMT	1	1.5%
Booch	0	0%

Source: Adapted from (Barry & Lang, 2003, p.222)

Table 2.4, shows that a quarter of respondents (24.6%) did not use any method for IS development, three-quarters of respondents adopted an in-house method for IS development, and a few respondents adopted SSADM and RAD.

In Thailand, there was an initiative to implement Executive Information Systems (EIS). There were four large organizations from three industries involved within the investigation. An organization from the transportation industry adopted in-house an evolutionary development approach, while one commercial bank from the finance industry adopted a traditional information system approach. This bank adopted the waterfall development approach for its EIS development. The other two organizations adopted an outsourcing approach for their IS development. The final two organizations came from the financial and energy industries (Fitzgerald, Philippides, & Probert, 1999). The following sections present the three main IS approaches which were SDLC, the waterfall model, and RAD.

2.4.2.1 Systems development lifecycle (SDLC)

Gibson and Hughes (1994) stated that a system lifecycle embodied the entire life span of a system. The design phase of the SDLC was frequently divided into logical and physical design. The logical design provided the user's view of the system which identified the desired logical assembly of the system that specified what the system will do and why. The physical design specified the way to implement the logical design. Most modern SDLCs adopted scientific management based on a systematic approach for problems-solving. Gibson and Hughes (1994) provided greater details of SDLC for successfully analyzing, designing, developing, and implementing the information system. SDLC outlined by Gibson and Hughes (1994) included problem definition, system analysis, system design, systems development, system testing, system implementation, formal review, system project modification and enhancement, and system maintenance. Kroenke and Hatch (1994) suggested that the general process of flow of systems development process included and commenced from business need, systems development process, information system, and business change. Some authors proposed a six stage systems development lifecycle comprised of feasibility study, system investigation, systems analysis, systems design, implementation, and review and maintenance (Avison & Shah, 1997).

Grenci and Hull (2004) used SDLC to teach ERP implementation and evaluation of the success of ERP implementation as in the MBA-level IS class. SDLC was also used to frame electronic commerce guidelines and fundamental concepts in an introductory business information systems class (Grenci & Carroll, 2005). Vliet and Pietron (2006) endorsed the use of SDLC as a comprehensive systems development approach in a course that remained a valid vehicle approach for systems development instruction class. The authors also received support from a former student who confirmed and admitted that the use of SDLC as a comprehensive systems development approach in the course provided students with a realistic and sound preparation for the workplace. Sinason and Normand (2006) adopted SDLC to guide students who enrolled in an accounting information systems (AIS) in order to understand all stages of the development process.

Russell and Yilmaz (2006) found that the use of balanced gap management can be applied in the practice of SDLC because it achieved successful improvement of customer satisfaction and acceptance of systems delivered by a software company. Moore, Nolan, and Gillard (2006) said the traditional SDLC was ambiguous. They proposed a high-level SDLC which had four main activities: brainstorming or idea generation, formal problem identification, suggested approach, and follow up and a universal development paradigm (UDP) which includes four major phases: analysis, planning, implementation, and maintenance.

O'Brien and Marakas (2006) proposed that the development of information systems comprised five steps: (1) systems investigation, (2) systems analysis, (3) systems design, (4) systems implementation, and (5) systems maintenance. O'Brien and Marakas' approach was a traditional approach for systems development process. **Systems investigation** is the initial step of every systems development process. There are several feasibility tests and cost/benefit analyses involved within this process. The feasibility analysis process involves organizational feasibility, economic feasibility, technical feasibility, and operational feasibility. Cost/benefit analysis covers tangible and intangible costs and tangible and intangible benefits. **System analysis**, they emphasized, is not a preliminary study but is an in-depth study of end-user information and requirements. Systems analysis includes organizational analysis, analysis of current systems, and functional requirements analysis. Systems design

specifies how the new systems will accomplish the systems development objectives. **Systems design** comprises user interface design, data design, and process design. **Systems implementation** is involved with hardware and software acquisition, software development, testing of programs and procedures, conversion of data resources, and education and training the end-users. The implementation process is difficult and time-consuming. Typically systems implementation needs project management because there are several cases where new systems development failed to deliver and implement. **Systems maintenance** process is the monitoring, evaluating, and modifying of the existing or fully implemented information systems to ensure that information systems are a desirable or necessary improvement. During the maintenance process, postimplementation review activity could be used to ensure that newly implemented systems meet business objectives. Systems maintenance process also included making modifications to implemented information systems (O'Brien & Marakas, 2006, p. 403-426). The summary of the stages of a systems development lifecycle is shown in Table 2.5.

Table 2.5:

Summary of SDLC stages

Gibson and Hughes (1994)	**Avison and Fitzgerald (1995)**	**Avison and Shah (1997)**
Problem definition	Feasibility study and system investigation	Feasibility study and system investigation
Systems analysis	Systems analysis	Systems analysis
Systems design	Systems design	Systems design
Systems development		
Systems testing		
Systems implementation	Systems implementation	Systems implementation
Formal review	Review and maintenance	Review and maintenance
Systems project modification and enhancement		
Systems maintenance		

Sources: (Avison & Fitzgerald, 1995; Avison & Shah, 1997; Gibson & Hughes, 1994)

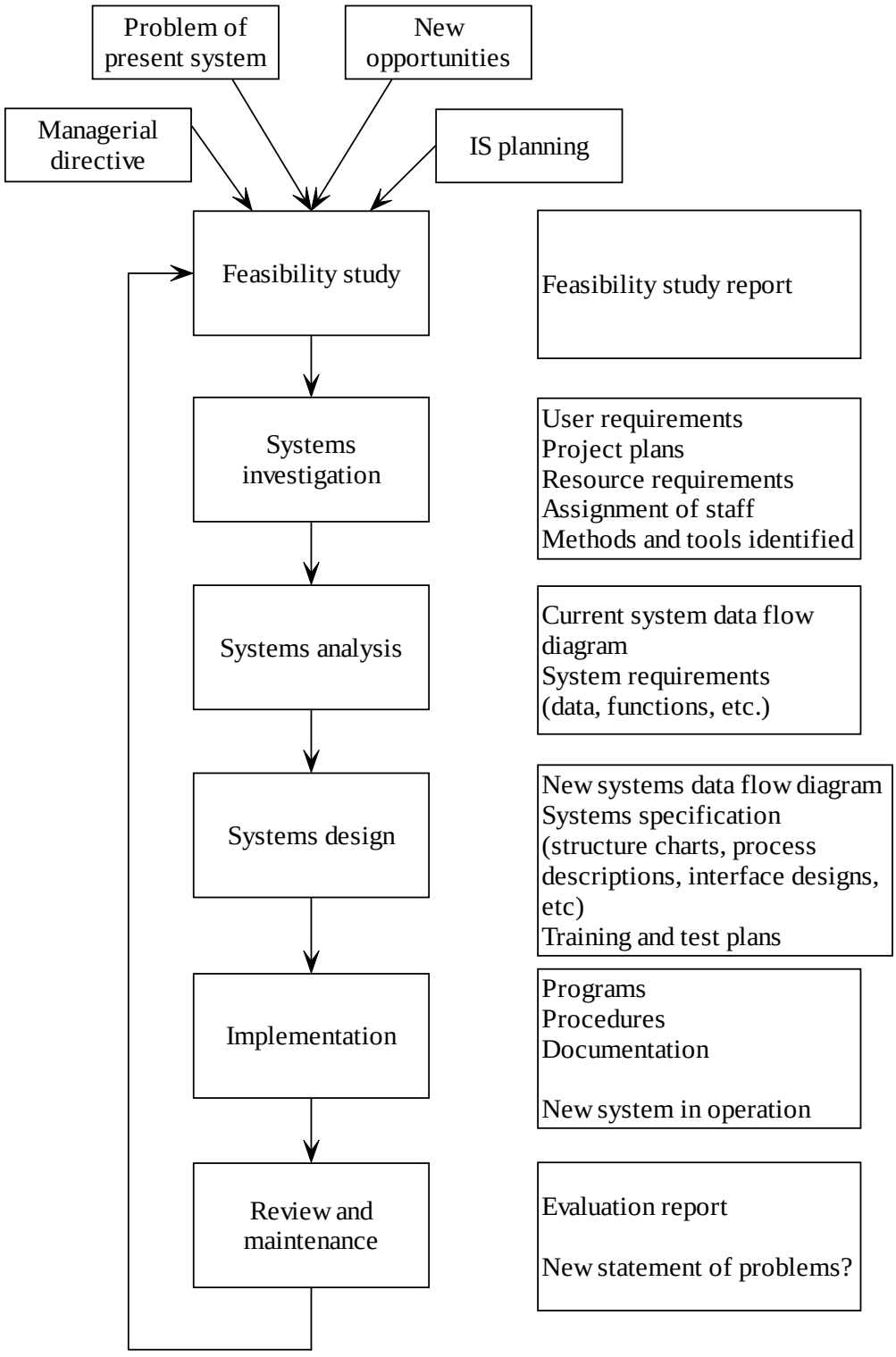
In terms of practical IS development, Fitzgerald (1998) conducted an empirical investigation regarding systems development methodologies adoption and found quite a negative perception among system developers who had over 12 years experience.

Only 6% of respondents were using systems development methodologies rigorously, whereas another 60% said they had never ever used systems development methodologies. Moreover, 79% responded that they were not intending to adopt systems development methodologies. However, the systems development methodologies still were used by IS managers and developers. Huisman and Iivari (2006) found that IS managers had a more positive perception of systems development methodologies than IS developers did because IS managers believed that systems development methodologies provided productivity and quality of development process.

Avison and Shah (1997) provided the model of an information systems development lifecycle. The major phases of an information systems development lifecycle are shown in Figure 2.11.

Figure 2.11:

Information systems development lifecycle



Source: (Avison & Shah, 1997, p.71)

2.4.2.2 The waterfall model

The waterfall method used the analogy of a waterfall to illustrate the lifecycle of development activities towards solutions. The waterfall method comprised requirements analysis, design, build, test, and implement in sequential stages. The waterfall method often failed to finish the project within the desired period of time because the stage between requirements and testing took a long time to complete and, in some circumstances, the problems were not found, or overlooked, until it was too late to perform major redevelopment (Lawrence, Newton, Corbitt, Braithwaite, & Parker, 2002). The waterfall model outlined the series of steps that should appear in building an information system. These steps usually occurred in a predefined order with a review at the end of each stage before the next step can be started (Bocij, Chaffey, Greasley, & Hickie, 2006, p.814).

The waterfall method was claimed as a traditional method software development which progressed through many development stages. The waterfall method was argued as an approach which took a long time developing a design specification. The full completion of each stage before commencing the next stage was a lengthy process. Therefore, in some cases the products were obsolete before the system was finished and also costs were high (Dornan et al., 2005). The waterfall model was refined to cope with the larger and more demanding software projects characterized by a growing level of complexity. The waterfall model offered a systematic development process. It is still used extensively in many software development projects (Benediktsson, Dalcher, & Thorbergsson, 2006).

2.4.2.3 Rapid application development (RAD)

RAD was initially named by Martin (1991) and well set in the context of Information Engineering (IE). Rapid application development (RAD) was a “method of developing an information system which used prototyping to achieve user involvement and faster development compared to traditional methodologies such as SSADM” (Bocij, Chaffey, Greasley, & Hickie, 2006, p.808).

In the UK, RAD users and suppliers formed a consortium to define standards and frameworks for RAD which led RAD to also be known as the Dynamic Systems Development Method (DSDM) (Avison & Fitzgerald, 1995; Barrow & Mayhew, 2000). DSDM is currently the de facto standard for RAD in the UK. The participative and iterative nature of DADM were similar to RAD and were believed to facilitate effective IS development (Barrow & Mayhew, 2000). RAD was one of the techniques to develop information systems that responded to the faster pace of economy and RAD became popular for accelerating systems development (Whitten, Bentley, & Dittman, 2001).

Avison and Fitzgerald (1995) agreed with Whitten et al. (2001) that the major objective of RAD was speeding up the development process which was an aim for both general management and information system management. RAD emphasized the extensive use of user involvement and prototype to accelerate the systems development process during requirement analysis and systems design. A prototyping approach was used for rapid development and testing of working models or prototypes. Prototyping as a development tool made the development process faster and easier than traditional SDLC. The prototyping approach was an iterative and interactive process which combined steps of traditional SDLC. The prototyping cycle involved system analysis, systems design, and systems implementation. A prototype was modified and revised several times until it reached the end-user's requirements (O'Brien & Marakas, 2006).

RAD followed systems analysis and adopted an iterative approach through a prototype loop until prototype was considered as a candidate for system implementation. RAD was a technique that fitted into traditional SDLC during the systems analysis and systems implementation phases by using the prototype loop. Dornan et al. (2005) agreed that RAD set out to produce a good quality product at reasonable cost. RAD used a rigid pace schedule, teamwork, informal communication, cyclic rather than sequential development, prototyping, and use of computer-assisted software engineering (CASE) tools to automate the process of development. These features provided a tight and explicit process of management. There was an additional reason why RAD became a growing trend to develop Information Systems (IS) rather than traditional analysis methods. It was argued that

traditional system analysis relied on identifying explicit requirements while RAD identified the different forms of knowledge and requirements (Eva, 2001).Therefore, RAD seemed to be a contingent approach to interactive software development which was characterized by a large amount of user involvement, incremental prototyping and product-based project management (Beynon-Davies, Mackay, & Tudhope, 2000).

Martin (1991) identified four key elements of RAD and called these the four pillars; these were tools, methodology, people, and management. These were user determinations of system requirements, user design that focused on participation between end-users and IT people for discussion of solutions, construction involved rapid prototyping during system design and integrations, and cutover was a delivery of the new system to end-users. RAD was characterized as "a risk-driven evolutionary IT development methodology that employed disciplined iterative planning and control, and leverage prototyping and development process automation tools and techniques to regularly deliver functionality that avoids specifications becoming obsolete" (Lawrence, Newton, Corbitt, Braithwaite, & Parker, 2002, p. 141). Lawrence et al. (2002) noted that RAD was designed to manage the changing requirements during a systems development process, used joint application development (JAD) workshops and focused on user involvement during the development process. In addition, it promoted prototype in response to changes, required a high level of commitment among participants, and requested high disciplines on project objectives in order to meet the project goals (Laudon & Laudon, 2000).

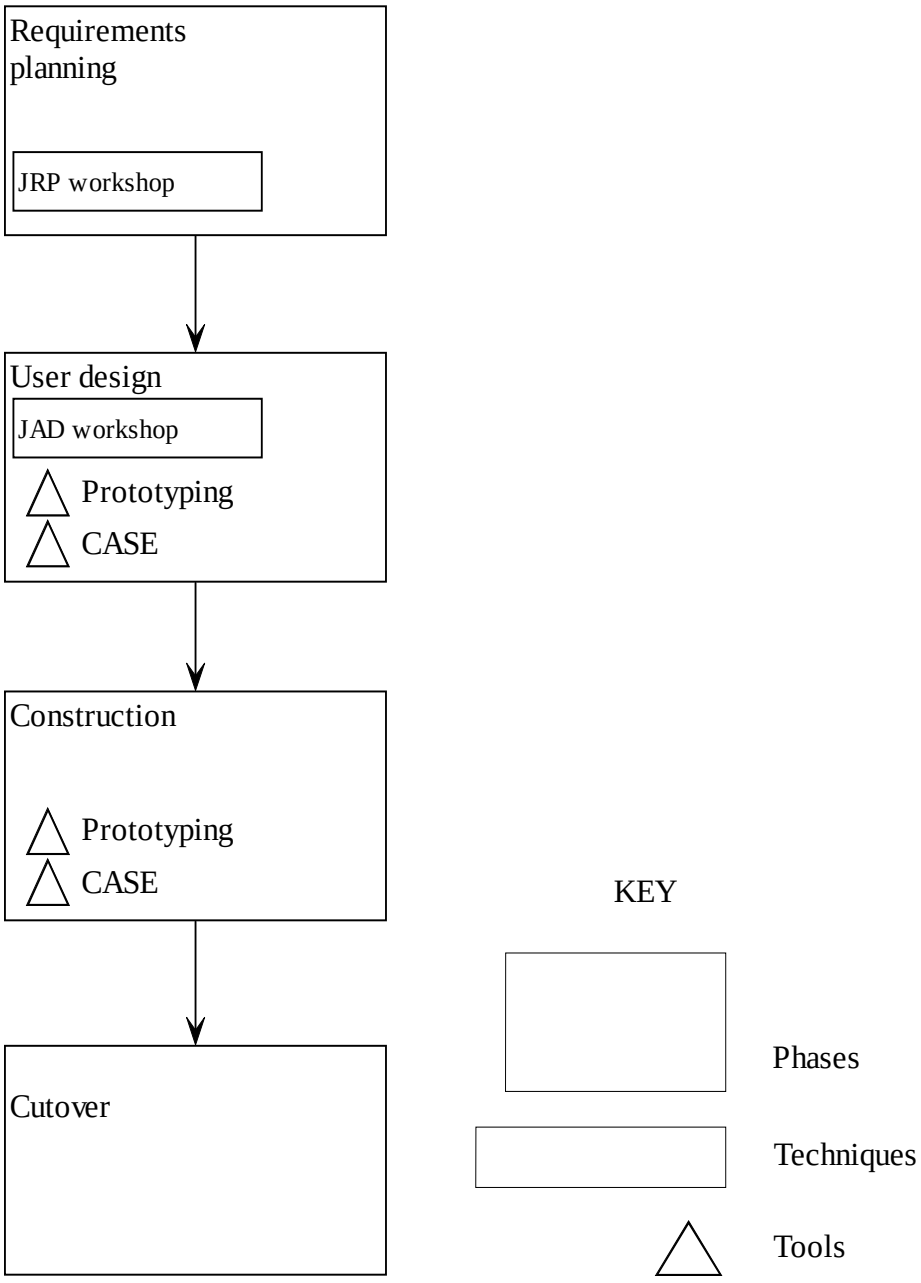
Beynon-Davies, Mackay, and Tudhope (2000) argued that RAD was a comparatively new ISDM which can be seen to be a response to the changing business and development environment. RAD also was seen as the response to two kinds of uncertainty: business uncertainty and development uncertainty. Bhattacherjee and Premkumar (2004) adopted RAD software usage as a case study for testing belief and attitude toward IT usage. RAD was used as a tool to improve the usability (effectiveness, efficiency, and appeal) of instructional materials for preservice teachers. It was found to have significant impact on increasing the usability (Lohr et al., 2005). Eva (2001) found that RAD was eminently more suited for eliciting the user requirements than the traditional analysis model. Compton (2002) argued that

RAD produced systems faster than any other methods and the systems developed by RAD tended to meet user expectations because users became an integral part of the systems development process and approved all decisions throughout the development cycle. Therefore, RAD reduced the amount of rework required prior to implementation.

Normally, RAD had four main phases: requirements planning, user design, construction, and cutover. RAD utilized joint application development (JAD) as a team technique during systems requirements determinations (SRD). RAD was believed to encourage team rapport and achieve synergy by leveraging the accumulated knowledge of team members. RAD has four phases which are depicted in Figure 2.12.

Figure 2.12:

Phases of the RAD approach



Source: (Avison & Fitzgerald, 1995, p.393)

2.4.3 Systems maintenance and modification phase

Software and systems maintenance was not a problem that one needed to avoid or eliminate. Systems needed to keep in sync with their environment and respond to the needs of users. Anquetil, Oliveira, Sousa, and Dias (2007) revealed that the

modification of existing systems was about 50%, changing the environment was about 25%, correction of error was about 5 %, and actual problems were about 25% of maintenance projects. The important and widespread maintenance function has grown throughout the years (Garg & Deshmukh, 2006). It is recognized that the maintenance phase consumes a large amount of time and resources (Boehm, 1976; Swanson & Beath, 1989). Boehm posited that the proportion of the required effort for the maintenance phase, in comparison with the original systems development process, was typically quoted as 70-80% (Boehm, 1976). Therefore, a large amount of time, effort, and resources were used for keeping systems going and performing for organizations. This finding implied that systems were typically unstable and constantly changing over time. In addition, the maintenance phase of systems was costly and time-consuming (Fitzgerald, Philippides, & Probert, 1999). Garg and Deshmukh (2006) agreed that it was not common that the maintenance and operation department were the largest, and each comprised 30% of manpower. Furthermore, the maintenance cost was next to the energy costs; therefore, maintenance cost was the largest part of any operational cost.

Once the information systems were installed and operating, the formal review was performed to identify any modifications and enhancements. This phase was also called postimplementation activities (Avison & Shah, 1997). New systems typically needed some modifications and enhancements. It was impossible to develop systems that met all users' hidden requirements and needs. The system maintenance also was involved with the modification of the system and developed programs to meet users' needs. The needs of business often changed as a result changes in the business environment; therefore, the systems had to change (Gibson & Hughes, 1994). Fitzgerald, Philippides, and Probert (1999) agreed and their research findings showed that the corrective maintenance resulting from inadequate original development and improper implementation of the original specification accounted for 15% of the total causes of changes. New business/strategic development and technology change accounted for 40%. The summary of causes of change is shown in Table 2.6.

Table 2.6:

Main causes of changes for systems maintenance and enhancement

Main causes of changes	Percent
Original specification not properly implemented	**4%**
Original specification inadequate	**11%**
Organizational changes	**13%**
Personnel changes	**3%**
Government/legal changes	**9%**
External factors e.g., banks, Inland Revenue, suppliers	**7%**
New business/strategic development	**22%**
New policies e.g., security review, financial cutbacks	**6%**
Technologies e.g., old hardware no longer maintainable	**18%**
Other	**7%**
Total	**100%**

Source: (Fitzgerald, Philippides, & Probert, 1999, p.326)

Bocij, Chaffey, Greasley, and Hickie (2006) also agreed that after the information system was operational, it was inevitable that there were requests for change and/or modification. The maintenance phase involved two different types of maintenance, known as unproductive maintenance and additional features and facilities, because the system needed to adapt and modify to meet the changing business requirements (Bocij, Chaffey, Greasley, & Hickie, 2006).

System maintenance occurred after the system had been signed off as suitable for users. System maintenance involved reviewing the project, and recording and acting on the problems with the systems (Bocij, Chaffey, Greasley, & Hickie, 2006, p.811). Whitten, Bentley, and Dittman (2001) suggested that a maintenance and reengineering project was performed by some combination of users and technical feedback. Technical circumstances and business changes were the two main reasons for maintaining and reengineering a project because new technology and new versions of technology were regularly being developed and also some new business

requirements and customer demands were key driving forces for process improvement. The final result of maintaining and reengineering was an updated business solution, revised programs, enhanced user interfaces, and improved new business processes. The systems support team consisted of a highly technical programmer who selected, installed, tuned and maintained the systems software. This team of people was highly talented and often held advanced degrees in computer science whereas systems analysis and application programmers normally possessed degrees in information systems (Kroenke & Hatch, 1994).

During the review and maintenance phase, there were three questions to be answered:

- Does the system do the job it was intended to and does it meet management and user objectives?
- How well does the system do this job, that is, how well does it achieve its objectives?
- What modifications have been identified as necessary? (Avison & Shah, 1997, p.261-262).

Normally organizations had ongoing maintenance such as update files, update records, backup files, and backup databases on a regular basis. These kinds of maintenance were not included in system maintenance. Hoffer, George, and Valacich (2004) gave a brief definition regarding maintenance as making changes to a system to fix or enhance its functionality. Gibson and Hughes (1994) proposed that there were three categories of maintenance: corrective maintenance, perfective maintenance, and adaptive maintenance. Corrective maintenance is involved with actions to eliminate errors and failures. Perfective maintenance focuses on actions to improve or maintain systems performance. Adaptive maintenance embodies the actions to adapt the existing systems to new functions or technologies. Fitzgerald, Philippides, and Probert (1999) found that corrective maintenance accounted for 28%, adaptive maintenance for 30%, and perfective maintenance was at 42% of maintenance activities. It was clear that corrective maintenance was the smallest component, whereas the other two types of maintenance (adaptive and perfective)

together exceeded 70%. It showed that the devotion of effort for enhancement and changing systems requirements was a large proportion of the maintenance phase. Hoffer et al. (2004) added preventive maintenance, which involved changes made to a system to reduce opportunities of future failure. In terms of value-added for types of maintenance, Andrews and Leventhal (1993) argued that corrective maintenance took up to 75% of effort in systems maintenance and this type of maintenance was claimed as nonvalue adding, corrective maintenance added little or no value for maintenance because corrective maintenance focused on eliminating and deleting defects from systems without adding new improvements and functionalities to the existing systems.

In terms of maintenance cost versus development cost, Kaplan (2002) reported that some organizations spent 60 to 80% of their information systems budget in maintenance activities. This argument was supported by Lytton (2001). Lytton canvassed 200 executives and found that on average 52% of programmers were assigned to maintain the existing systems while only 3% were assigned to new development. Pressman (2001) posited that there has been a dramatic increase in cost of systems maintenance from 1960s to the present. During the 1960s and 1970s, the maintenance cost was 35 to 40%. The cost increased to 40 to 60% during the 1980s and 1990s. From the 1990s to the present, the system maintenance cost was recorded as 70 to 80% of the information system budget. It is clear that the systems maintenance phase is a significantly important phase for systems development and performance improvement.

Fitzgerald, Philippides, and Probert (1999) investigated and reported regarding systems development and maintenance and reasons for changing and enhancing the systems. From survey questionnaires, the authors collected data from IS managers and information systems development professionals from companies in the UK.

2.5 Summary

This chapter presents the existing literature that is associated within this study. The literature starts with the team concept which is narrowed into the area of the cross-functional team and team effectiveness. Then the area of process improvement is discussed. The process improvement area is divided into two parts: IT-driven process improvement and nonIT-driven process improvement. The last area of the study focuses on systems developments, but the point of concern is located in the area of postimplementation of systems development with a main emphasis on the process of modification and maintenance of the systems. The final part discusses the gap within the associated areas of study. The next chapter will present the theoretical basis of the research methodology and justify the selected research paradigm and methodology.

Chapter 3 Research Methodology

This chapter provides and presents a research plan for the action research. It begins with the selected research paradigms or theoretical perspectives. The selected research paradigms and research methodology are identified and justified as the theoretical stance and research method of the research. A brief overview of data collection and analysis are demonstrated. The issues of reliability and validly are discussed and justified.

3.1 Selected research paradigm or theoretical stance: Qualitative research

The researcher will adopt a qualitative research paradigm as the research theoretical stance because the objective of this research is to investigate and create process improvement of Internet banking maintenance and modification. The researcher will implement interventional change techniques and be involved in Internet banking maintenance and modification phase improvement. The researcher is part of the Internet banking maintenance and modification team. The roles of the researcher are research facilitator, team member, and observer. Therefore, there is no isolation or separation between the researcher and the subject of the study.

Table 3.1 lists the various authors who provide different views on theoretical stances. Drawing on the work of a range of authors, the researcher carefully examines all the different theoretical stances. The researcher studies each theoretical stance and considers an appropriate theoretical and methodological stance for this thesis, finally deciding to adopt a qualitative research paradigm as the research theoretical stance.

Table 3.1:

The justification of research paradigms

Research paradigm	Justification of research paradigm
Burrell and Morgan (1979)	
Subjectivist and objectivist approach	**Subjectivist approach**
Two dimensions and four paradigms	**Interpretative paradigm**
Lincoln and Guba (1985)	
Naturalistic inquiry	**Naturalistic inquiry**
Creswell (1994)	
Quantitative and qualitative research	**Qualitative research**
Hussey and Hussey (1997)	
Positivist and phenomenological paradigms	**Phenomenological paradigm**

The following sections provide the discussions regarding the justification of research paradigms based on different authors who provide various theoretical stances.

3.2 Justification of research paradigm or theoretical stance

The justifications of the research paradigm will based on Burrell and Morgan (1979), Lincoln and Guba (1985), Creswell (1994), and Hussey and Hussey (1997). The following sections will explain why this research is best undertaken through qualitative research.

3.2.1 Burrell and Morgan (1979): Subjectivist and Interpretative

It is clear that, based on Burrell and Morgan (1979), the nature of this research is well suited to the subjective approach. The nature of this research places it within the four assumptions of the subjective approach because of the assumptions of nominalist ontology, anti-positivist epistemology, voluntary human nature, and ideographic methodology.

Nominalist ontology: The nature of this research takes a subjective approach; social reality is subjective and depends on the researcher's interpretations regarding the created knowledge. The researcher can not keep a distance from the subject of research; in contrast, the researcher is part of the subject of this research in order to observe, understand, and explain the unique phenomena of this research context.

Anti-positivist epistemology: The researcher believes that the only way to improve the process of Internet banking maintenance and modification is to understand, participate, and be involved in the Internet banking development systems process. The researcher needs to get involved in the development process in order to understand the existing process and implement change techniques for the process improvement of Internet banking maintenance and modification. The knowledge is created from in-depth understanding and observation gained through participating in the research process.

Voluntarism human nature: The context of this research is determined by the situation during the research process. Team members have full authority and autonomy to determine all activities in order to achieve the Internet banking maintenance and modification process improvement.

Ideographic methodology: This research does not adopt the process of testing a hypothesis with scientific rigor. This research values the first-hand knowledge that derives from the viewpoint that one can understand the social world by obtaining first-hand knowledge of the subject under investigation. The researcher gets close to the subject researched by exploring the details, background and life history.

Interpretative paradigm: This research project adopts an interpretative paradigm. In interpretative paradigms, people understand the world as it is. Interpretative theorists understand the fundamentals of nature and the social world at the subjective level. Interpretative philosophers seek to understand the basics of social reality and attempt to understand human consciousness and subjectivity. In this research, the researcher decided to be a participant in the Internet banking maintenance and modification team

and an observer. The researcher wished to understand the operational process of previous Internet banking development and then attempted to introduce interventional changes into the Internet banking development process. At the same time, the researcher observed and evaluated the change process and its achievement in terms of the efficiency and effectiveness of Internet banking development process.

3.2.2 Lincoln and Guba (1985): Naturalistic inquiry

This research shares similar characteristics with the naturalistic paradigm. The 14 characteristics of naturalistic inquiry provide a clear guideline of how this research will be conducted. The following sections discuss how this research associates to naturalistic inquiry.

Natural setting: The researcher chooses to carry out this research in the natural setting because realities can not be understood and insolated from the context or setting of study. The researcher needs to interact within the entity in context in order to gain full understanding of the study context. Within this research, the role of the researcher is to be one of the team members and participate closely during the entire research process:

Human instrument: The researcher uses himself as the instrument of data-gathering because the human instrument has a capability to grasp and realize the meaning of the interaction among team members during the research process;

Utilization of tacit knowledge: Propositional knowledge (knowledge expressible in language form) and tacit knowledge (knowledge from intuitive and feeling) emerge during the research process between the researcher and research participants. During the team members' meeting and research process, the researcher has opportunities to capture and realize tacit knowledge because the interaction between the researcher and team members creates such knowledge.

Qualitative methods: Qualitative research provides flexibility to deal with multiple realities that come from the interaction between the researcher and team members.

Qualitative methods seem flexible and are able to describe the phenomenon based on the researcher's interpretations.

Purposive sampling: Random and representative sampling can prevent the multiplicity of realities from being uncovered. Therefore, purposive sampling allows the researcher to discover several realities during the research process. The specific information and knowledge will emerge from team members' reflection on the whole Internet banking maintenance and modification process improvement.

Inductive data analysis: This mode of data analysis allows the researcher to analyze the realities that have been found in the study and describe them in-depth. The research findings derive from participation, observation, and involvement in the subject of the study.

Grounded theory: There is no previous research study on the Internet banking system development process. Therefore, there is no prior theory or model in the existing field. For naturalistic inquiry, there is an opportunity for the theory or model to emerge from the collected data and from the study. The main objective for this research is to create a theory or model of the Internet banking development process.

Emergent design: There are unknown phenomena and realities within this research; therefore, it is impossible to establish the proposition in advance. The researcher may not have a chance to understand the patterns of phenomenon in advance. It also has unpredictable outcomes. Therefore, the researcher should let the research design emerge based on the context of the study.

Negotiated outcomes: The meanings and interpretations of collected data need to be collected from team members because the specified outcomes are best verified and confirmed by people who have been in the context. The team members are in a better position to understand and interpret the generated knowledge because of their local knowledge and understanding of the research setting.

Case study reporting mode: The case study report seems to work well with the description of this research context and nature. The report on the outcomes of the study seems to suggest a less scientific and technical report rather than a positivist scientific report.

Idiographic interpretation: This research tends to interpret ideographically in terms of drawing the conclusion for particular cases rather than generalizing. The reality and knowledge that have been found in the study can be interpreted differently depending on the context of the study. Therefore, the interpretation relies heavily on local knowledge and the particular context to explain the particular phenomenon.

Tentative application: The research outcomes generate unique reality in particular research settings. The research findings explain what is going on during the research process. In general, the research findings may not be able to be duplicated or applied to other research settings. The contextual values may vary from setting to setting. Therefore, the research findings will explain that the research phenomenon and findings may not make sense in other settings.

Focus-determined boundaries: The boundary of this research has been narrowed to the scope of Internet banking maintenance and modification process improvement. The researcher discussed the scope of the research with the research partner to ensure that both parties receive benefits from conducting research.

Trustworthiness: The form of internal and external validity, reliability, and objectivity do not fit well with the research context. The researcher needed to seek new criteria to replace both internal and external validity and reliability. The new criterion is trustworthiness.

3.2.3 Creswell (1994): Qualitative research

Creswell's quantitative and qualitative paradigm assumptions lead the researcher to believe that the nature of this research fits well into the qualitative paradigm. There

are several explanations for the fittingness of research within qualitative paradigms. First, the outcome for this research study is subjective, an outcome which is difficult to measure through quantitative measurement. The researcher attempts to understand what is going on after the implement of interventional change techniques for the process improvement, and to create a model for Internet banking maintenance and modification process improvement. Secondly, the role of researcher is not only that of the observer of the process but also as a member who participates directly and closely with other team members. There is no separation between the researcher and the subject of the study. Thirdly, the researcher and team members have shared the same objectives for Internet banking performance improvement. The research outcome is value-laden and biased because both the researcher and the research partner wish to achieve two main outcomes. The first outcome is organizational. The researcher and team members desire to achieve significant improvement regarding the performance of Internet banking maintenance and modification and Internet banking services. The second outcome is academic, with its main emphasis on extended knowledge in the area of the Internet banking domain, process improvement, and postimplementation of systems development. Finally, there are some degrees of bias in this research process. Bias is an unavoidable factor for this research because there is a high involvement between the team members and the researcher. Furthermore, the researcher is part of the team, and this research is value-laden. There is no research prototype or prior research design for this research. The research is designed to accommodate this specific context of study.

3.2.4 Hussey and Hussey (1997): Phenomenological paradigm and inductive research

Based on Hussey and Hussey (1997) there is evidence that this research fits into the phenomenological paradigm. The first feature is size of sample. Within this research the sample size or unit of analysis will be the number of team members. The sample is limited to people related to Internet banking development. The purpose is to gain in-depth insight into the phenomenon under study. Hussey and Hussey mention that “the aim for phenomenological paradigm is to get depth, and it is possible to conduct

such research with a sample of one" (Hussey & Hussey, 1997, p. 55). The second feature is the theory-driven aspect. This research does not plan to study the literature and select the appropriate theory and construct a hypothesis. This study does not rely on the existing theories; in contrast, the aim for this research is to establish new theory to explain and describe the phenomena or patterns which emerge from the data. The purpose is to generate a theory or model of Internet banking maintenance and modification process improvement. The third feature is the type of data collected. The data collected for this study are subjective and rich with description. They include interview transcription, field notes, memos, and on-site observation. These types of data are qualitative and need to be analyzed in a qualitative way. The fourth feature is the location of the study. The location means the setting of the study, whether it is a natural or organizational setting. There is no control of the environment or artificial and manipulated setting.

Inductive research develops theory from observing the reality and particular instances, using a relatively small sample size. This research limits its sample size to team members' reflections on the implementation of interventional change techniques. The researcher observes what is going on during the research process and interviews the team members to gain their reflections on the research process. The research findings and conclusions are drawn from the rich data from team members. This approach also requires the researcher's viewpoint to interpret the explanation of the unique phenomena.

In summary, based on Burrell and Morgan's (1979) four paradigms for the analysis of social theory, Lincoln and Guba's (1985) naturalistic inquiry, Creswell's (1994) quantitative and qualitative research, and Hussey and Hussey's (1997) positivistic and phenomenological and inductive and deductive perspectives, this research fits well with the qualitative paradigm.

3.3 Information systems (IS) research framework

Altrichter (1991) asks the interesting question “Do we need an alternative methodology for doing alternative research?” The answer from those researchers who are not committed to the traditional-empirical research approach would be “Yes” because different research settings and natures should have different research methods; the traditional-empirical research approach would not be suitable for all kinds of research. The different phenomena of social science need an alternative method that natural science is not dedicated to. Therefore, there is a need for alternative research to deal with phenomena where the traditional-empirical research is not appropriate.

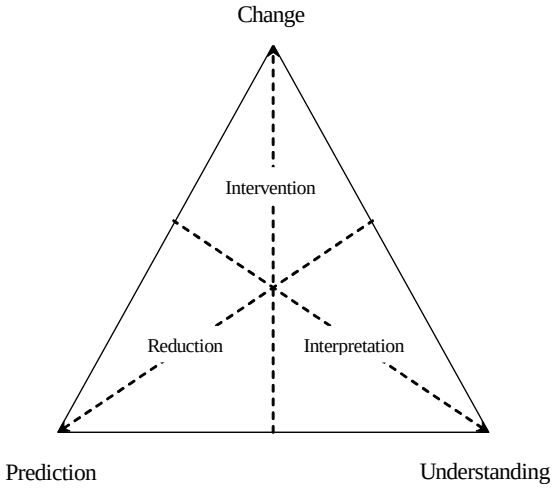
Braa and Vidgen (1999) present the IS research framework. They propose three research approaches with three research outcomes. The positivist approach supposes that phenomena can be observed objectively and rigorously, in contrast to the interpretivist approach which presumes that the approach of natural science, like the positivist approach, is inappropriate when people are involved in the research process because different people seem to interpret differently. Therefore, interpretativist researchers attempt to understand the meaning of human life and make sense of the context in which they live.

However, positivists and interpretativists have some degree of intervention into research settings by being either an objective outsider or a subjective insider. Action research is a form of research used to gain learning and knowledge through deliberate interventions in order to achieve some desirable changes in the organization or research setting.

The framework of IS research comprises points, sides, and constraints. The points represent the research outcomes which are prediction, understanding, and change. Prediction aligns with the systematic reduction of a positivist approach; understanding aligns with interpretative approach; and change aligns with the intervention approach. The framework is shown below in Figure 3.1.

Figure 3.1:

An IS research framework for the organizational laboratory



Source: (Braa & Vidgen, 1999, p. 28)

In summary, it can be seen from the model that positivism adopts reduction method to make a reliable prediction and explanations. Interpretativism uses interpretation techniques to make sense with the situation in order to gain understanding in the context of the study. Action research as a form of research utilizes intervention in order to achieve a desirable change in the organizational setting.

Table 3.2:

Summary of IS research framework

Research approaches	**Methods**	**Research outcomes**
Positivist	Reduction	Prediction
Interpretativist	Interpretation	Understanding
Action research	Intervention	Change

Source: (Braa & Vidgen, 1999)

Braa and Vidgen (1999) present and propose the IS research framework for use within the IS research field. These three research approaches use different methods to

conduct research and these three approaches generate different research outcomes. Therefore, apart from how the researchers view the social reality and the world, the researchers need to be concerned with the outcome and the nature of research in order to justify the appropriate research methodology for the research context.

3.4 Selected methodology: Action Research

The initial researcher to introduce the principle of action research to social science research was the social psychologist, Kurt Lewin (Lewin, 1943). Lewin investigated some aspects of people's eating preferences and the process of change in food habits. The initial work was not called action research until 1946. Lewin wrote a chapter entitled "Action Research and Minority Problems" for the *Journal of Social Issues for Society for the Psychological Study of Social Issues.* Lewin introduced two types of questions: the study of general laws of team life and the diagnosis of a specific situation (Lewin, 1946). Lewin's initial contribution to social science was the use of scientific knowledge to create change and make social improvement via the process of employing cycles of analysis, fact-finding, conceptualizing, planning and evaluating of the problems to create new knowledge for acquiring insight into social systems (Gronhaug & Olson, 1999).

Blum (1955) says "action research means diagnosis of a social problem with a view of helping improve the situation" (p. 1). He divides it into two main stages: diagnostic and therapeutic. The diagnostic stage refers to the stage in which the problem is analyzed and hypotheses are being developed. The therapeutic stage refers to the stage in which hypotheses are tested by a consciously directed change of experiment, preferably in a social life situation (Blum, 1955, p.1). During the therapeutic stage, change is introduced and has an impact on the study.

3.4.1 Action Research in Information Systems

Information systems traditionally reside within the area of technology (Galliers & Land, 2002) and the foundation of information systems lies in computer science and

engineering which are inclined to appreciate mathematics and physics (Baskerville & Wood-Harper, 2002). However, in the social science domain, many researchers started to realize the emergence of information systems in social science because the introduction of information technology into the work place means researchers have to pay more attention to the human rather than the technical aspects. As a consequence, Information Systems research has become popular and gained acceptance in the social sciences (Baskerville & Wood-Harper, 2002).

In addition, many researchers realize and appreciate the extended focus of study which includes behavioral and organizational considerations. Such researchers attempt to enhance the level of effectiveness of information system implementations in organizations while at the same time wishing to investigate the impact of information systems at both individual and organizational levels (Galliers & Land, 2002).

The extended area of research in information systems creates more complexity and greater imprecision which leads to different interpretations of the same phenomena. This situation arises because the broader view focuses on the area of the relationship between organizations and people in organizations. Therefore, there is a need for a new or alternative approach to research in the new areas.

In general, the dominant research instruments for social science researches are based on the empirical tradition which adopts the philosophy of natural science. As much as 50 % of research adopts laboratory-based experimentation or field survey. Both methods emphasize the use of mathematical and statistical analysis in order to search for the exact measurement for the relationship between the variables. This approach leads to major problems. The first problem is that in some situations study under laboratory conditions is not suitable and the knowledge is difficult to reproduce in the real word environment. For example the study of decision–making in manager behavior can not be studied in the laboratory. This type of study needs to be located within the organization. Another problem is the principle of applying values to variables; this is difficult because some variables are hard to value, for example,

stress, noise, and commitment. The limited number of factors in the study and the preciseness of measurement could also mislead the unsuspecting (Galliers & Land, 2002).

In addition, researchers who conduct research on this basis gain acceptance and are assured that the research findings will be accepted comfortably among the traditional social science researchers. In contrast, new discoveries from research findings which do not adopt the positivist tradition have proved threatening to research findings based on the view of positivist science researchers have been discredited (Baskerville & Wood-Harper, 2002).

As a result, the more recent postmodern views of social science researchers have dismissed the idea of absolute scientific paradigms. The alternative philosophies and methods emerged during the postpositivist period. Some of the emerging methods are grounded theory (Glaser & Strauss, 1967), deconstructionism (Rosenau, 1992), and action research (Baskerville & Wood-Harper, 2002).

Baskerville and Wood-Harper (2002) praise action research as a paragon of the postpositivist research methods. Action research is not only empirical but also interpretive. Action research is not only experimental but also multivariate. Action research is not only observational but also interventionist. Action research is an interventionist approach to the acquisition of scientific knowledge and has a sound foundation in the postpositivist research paradigm tradition.

Action research seems to be an appropriate method for investigating information systems because an information system is an applied field which has a vocational nature. Action research has a clinical nature which places action researchers into the position of “helping-role” in organizations. It is no wonder that action research has been accepted as good organizational development practice and has become the primary method for the practice of organizational development. Therefore, the nature and characteristics of action research involves and promotes close collaboration for

both researchers and practitioners. These fundamental aspects of action research were essential for information systems researchers during the decade of the 1990s.

3.5 Justifications of research methodology

The nature of this research is placed in the phenomenological or qualitative research paradigm. Several research methodologies are supported by the phenomenological paradigm. The research methodologies related to the phenomenological paradigm are action research, case studies, ethnography, feminism, grounded theory, hermeneutics, and participative enquiry (Hussey & Hussey, 1997). Consideration of the lists presented by Hussey and Hussey (1997) suggests that action research and participatory enquiry are appropriate methodologies for this study. The following section provides some brief details about these two methodologies.

Action research assumes that social work is regularly changing, and the researchers and their researched setting are part of the social change. Action research is applied research designed to find an effective way of creating interventional change. The main purpose of action research is to get into the research setting, attempt to bring change into the research setting, and monitor the results of interventional change. Close collaboration is significantly important for this method.

Participative enquiry refers to research that research with people rather than does research on people. The main objective of participatory enquiry is quite similar to that of action research, which is that the participants in the research study are involved as much as possible in the research process which can be conducted in their organizations. Participants are involved in data collection and analysis. The basic concept for both action research and participative enquiry is to see people as co-researchers or cocreators of knowledge via participation, experience, and action.

In summary, the researcher believes that this research is well placed within the phenomenological paradigm of Hussey and Hussey (1997), and based on the IS research framework of Braa and Vidgen (1999), and that the most suitable research methodology for this research project is action research, so these have been selected.

Why is action research suitable for research study? The nature and characteristics of action research provide several rationales for the researcher to show that action research is an appropriate method for this study. The justifications choosing an action research context will be presented in three broad categories: research context, research process, and research outcomes.

The first justification is that there is no hypothesis testing within this research project. There is no existing knowledge regarding the Internet banking maintenance and modification phase of process improvement in the field. There is an opportunity to research and generate extended knowledge for the field. The research design is exclusively designed to suit the research partner's Internet banking maintenance and modification process improvement.

The second justification is that the main purpose for this research is to generate a theory of Internet banking maintenance and modification process improvement. This research focuses on theory building rather than theory testing. The researcher wishes to create a theory or model which can be tested or applied to other fields and contexts for future research.

The third justification is this research process requires a high level of participation for the researcher and team members. The researcher is part of the team and works closely with the team members. The researcher gets into the organization involved in the context of the study and attempts to understand and gain insight into the research setting. The researcher brings academic knowledge, introduces a structured problem-solving model, and implements interventional change techniques. The researcher and the team members share their expertise and experience while conducting the research.

The fourth justification is the values of the research project are bonded and shared between the researcher and research partner. It is not a value-free context of research. Both the researcher and team members desire to achieve the desired outcomes while the researcher expects to generate some academic contributions from the research process and outcomes within the study.

The fifth justification is the researcher attempts to change the existing Internet banking development systems process and create Internet banking maintenance and modification process improvement and an effective team performance for the Internet banking development process. The researcher plans to create change and gain insight into the Internet banking maintenance and modification process. These justifications provide supportive reasons for adopting action research.

In this research, action research is the appropriate research methodology. Therefore, in the following section, the researcher presents some general and unique characteristics of action research, and the justification for action research as the chosen research methodology.

Research context: Action research is suitable and most valid within the context of organizational change and development because the primary objective for action research is to create change and improvement. The action researcher is involved and participates in the organization, and works closely with the research partner. The involvement and participation provide an opportunity for the action researcher to acquire particular information about the situation and to understand the context of organizational problems. The understanding of the context assists the action researcher to generate the appropriate solutions for immediate organizational problems.

Research process: The establishment of client systems infrastructure provides an outstanding opportunity for the action researcher to participate and cooperate with team members. The action researcher provides the academic knowledge and team members share their practical knowledge and experience. The research contributions can be shared between the action researcher and research partner. In the action research process, the action researcher is not a privileged observer, analyst or expert, but is actively involved in the action research process. The roles of action researcher are research facilitator, research team member, and observer. Team members perform and utilize the cyclic action research process. Team members diagnose and identify the organizational problems and decide the desired future and organizational

outcomes that the research partner wants to achieve. Team members formulate accurate and effective action plans to address the organizational problems. The action plans can then be implemented and evaluated. The results or research findings of the implemented action plans can be identified and modified if the team members are not satisfied with the research outcomes. The results of implemented action plans are designed to alleviate the immediate organizational problems. Organizational learning exists among team members. New knowledge and theory can be generated which is derived from results of implemented action plans from the multiple iterations of action research cycles.

Research outcomes: Action research generates both organizational and academic contributions. For the organizational contributions, action research tends to create the desired future for the people in organizations. For the academic contributions, action research offers an opportunity to generate knowledge which will further the enhancement of model or theory development. Action research generates theory grounded in action. Basically, action research uses theory to provide the guideline for diagnosis and action planning to deal with the organizational problems. The intervention allows the action researcher to introduce new techniques into the context and test the introduced techniques in the context under study. Without the intervention, the action researcher can not create new knowledge. Then the consequences of the action implementation are reflected on in relation to supporting the existing theory, revising the existing theory and/or generating new theory.

For these reasons, the researcher decided to adopt action research as his research methodology. The context and desired outcomes of this research are well fitted with the nature and characteristics of action research. Therefore, action research is the most appropriate research methodology for Internet banking maintenance and modification process improvement.

3.6 Unit of Analysis

3.6.1 Research unit of analysis

Unit of analysis refers to "the kind of case to which the *variables* or phenomena under study and the *research problem* refer, and about which *data* is collected and analysed" (Hussey & Hussey, 1997, p. 137). Patton (1990) provides very useful criteria for selecting the unit of analysis of a study saying "the key issue in selecting and making decisions about the appropriate unit of analysis is to decide what it is you want to be able to say something about at the end of the study" (Patton, 2002, p. 229). However, Hussey and Hussey (1997) provide some examples of different levels of unit of analysis which are shown in Table 3.3.

Table 3.3:

Examples of units of analysis

Unit of analysis	Description
An individual	**A person is the most common unit of analysis in business research, for example, a manager, a union member or a customer.**
An event	**This is a particular incident, for example, a strike, a decision to relocate or a purchase.**
An object	**In business research this is likely to be a commodity, for example, a machine, a product or a service.**
A body of individuals	**This includes teams of people and organizations, for example, a work team, a committee or a department.**
A relationship	**This is a connection between two or more individuals or bodies; for example, a buyer/seller relationship, a manager/employee relationship, a management/union relationship, a company/supplier relationship or a relationship between a head office and its retail outlets. (An individual or body may be part of more than one relationship.)**
An aggregate	**This is a collection of undifferentiated individuals or bodies with no internal structure, for example, supporters of a particular football club, parents of children at a certain school, sole traders in a particular part of city, or companies in a specific industry.**

Source: (Hussey & Hussey, 1997, p.123)

3.6.2 Justifications of unit of analysis

Based on the Patton's criteria and Hussey and Hussey's example, the unit of analysis for this study is an event and a body of individuals. Unit of analysis as an event: This unit of analysis refers to the period of time that team members come to work together as a team to conduct the Internet banking maintenance and modification process improvement project. Unit of analysis as a body of individuals: This unit of analysis refers to the individual team members who participated and were involved in conducting the Internet banking maintenance and modification process improvement project. The unit of analysis for this research is an Internet banking systems development team.

3.7 Data Analysis

In this section the researcher attempts to identify the selected data analysis methods for this research. In qualitative research, many data analysis methods have been used by qualitative researchers to analyze qualitative data. Qualitative data are a form of data which is not in numeric form, and includes texts, images, tape recordings, audiotapes, and behaviors. There are various qualitative data analysis methods for qualitative research to choose from because different kinds of qualitative data require different methods of analysis. There is no single method which suits all qualitative data and the nature of qualitative research. The data analysis procedures will be fully discussed and presented in the data analysis in Chapter 4.

Grounded theory is one of the most commonly forms of data analysis used in qualitative research. Glaser and Strauss (1967) present grounded theory as a method for discovery of theory from data which are systematically obtained from social research. Grounded theory assists the researchers to assign meaning to the observations in their data documents in terms of the constant comparative method. This set of practices consists of joint coding and analysis of data which offer logic for composing conceptual elements for theory development. This constant comparative method is conceptualized and described in four stages: comparing incidents applicable to each category, integrating categories and their properties, delimiting the

theory, and writing the theory (Glaser & Strauss, 1967). Glaser (1978) introduces two levels of coding; open coding and selective coding. Strauss (1987) adds axial coding to describe three forms of naming and comparing at different levels of conceptual perspective that cover the first three stages of analytic activity. Therefore, generating theory involves data being collected systematically through field observations, interviews, meetings, and or documentations. Coding for emergent concepts is achieved by close scrutiny with the intention to develop core categories. Theory development exists around one or more core categories which show some patterns of behaviors that are found in research phenomena (Douglas, 2003).

3.8 Justifications for design of data analysis

Several qualitative data analysis methods look interesting and applicable for this research. There are some issues to be considered when deciding data analysis methods. The first issue is the content and amount of data from data collection. The other issue is the availability of a data analysis tool and its compatibility with collected data.

In terms of the content and nature of collected data, for this research, data will be collected from Internet banking maintenance and modification process improvement team members. The researcher will conduct a semistructured interview with each individual team member. The interview covers the team members' opinions of and reflections on the implementation of the four intervention change techniques. The researcher wishes to investigate the performance of intervention change techniques and hopes to generate a model for Internet banking maintenance and modification process improvement. There are six team members within the team, including the researcher, providing a maximum of five in-depth semistructured interviews.

The other issue is the availability of data analysis tools. A wide range of data analysis methods and techniques are available. Some methods and techniques involve no cost, but a licence fee applies for the content analysis software Nvivo. Nvivo looks promising for qualitative data analysis; the software provides functions and features

that will not be used by the researchers. Therefore, special software is not required to perform data analysis.

The methodology of qualitative data analysis is a highly personal activity (Jones, 1993). In this study the researcher decides to adopt the traditional way and simplified version of qualitative data analysis by using grounded theory action research (Robertson, 1995). The procedures for this qualitative data analysis process comprise five main components. These are (1) Organizing and managing data; (2) Categorizing categories and themes; (3) Tabulating themes and research variables; (4) Explaining phenomenon; and (5) Modeling and presenting research findings. At the beginning of Chapter 4 - Data Gathering and Data Analysis - the researcher will explain in detail how data were collected and the planning for data analysis. The chapter will then present the research findings for discussion in Chapter 5, Research Findings.

3.9 Validity and reliability

This section commences with reviews of general concepts of validity and reliability in quantitative and qualitative research. In addition, the terms credibility, validity, and rigorousness in action research will be discussed. The final section of this validity and reliability section will explain how the researcher plans to cope with the validity and reliability issues.

3.9.1 Validity and Reliability in Qualitative Research

In social science research, validity and reliability have been used to evaluate the quality of research studies. However, the terms validity and reliability in quantitative and qualitative differ. Lee (1999) provides a simple and technical definition for reliability. The simple definition for reliability refers to the consistency and stability of scores. These scores are the result of a measurement process. Consistency means repeatability, and stability means the scores remain consistent over time. The technical reliability refers to “the strength of the shared systematic variance, usually conceptualized as some statistical association, between a theorized entry and an overt

indicator of that theorized entity (e.g. scores resulting from a measurement process)" (Lee, 1999, p.147). Hussey and Hussey (1997) define reliability as "being able to obtain the same results if the research were to be repeated by any other researcher" (Hussey & Hussey, 1997, p.78). Cook and Campbell (1979) define internal validity as the extent to which variations in an outcome (dependent) variable can be attributed to controlled variation in an independent variable. A causal connection between independent and dependent variables is usually assumed. External validity is defined as "the approximate validity with which we infer that the presumed causal relationship can be generalized to and across alternate measures of the cause and effect and across different types of persons, settings, and times" (Cook & Campbell, 1979, p.37).

The traditional viewpoints on reliability and validity suggest that these concepts are not applicable to qualitative research. However, reliability and validity are the two concepts for evaluating the quality of research and research findings. It is, therefore, important to understand how qualitative research handles these two concepts for measurement of the quality of research studies and the research findings. Consequently, the following section will provide some general knowledge regarding validity and reliability from the viewpoint of qualitative research.

The epistemological and ontological natures of qualitative research are different from those of quantitative research. The traditional measurement for research quality based on validity and reliability seems to be inappropriate for the measurement of the quality of qualitative research. However, reliability and validity are the key measurements in social science research. The challenge for the qualitative researcher is to prove that the qualitative research method and research findings are trustable and believable. Some qualitative researchers have illustrated their views and opinions on how qualitative researchers deal with and handle the issues of validity and reliability. This section discusses the viewpoints of Yin (1994), Kvale (1996), Marshall and Rossman (1995), Maxwell (1996; Maxwell, 2005), and Lincoln and Guba (1985).

Yin (1994) proposes four kinds of validity for case study research. Construct validity refers to the correctness of measurement for the concept of the study which aims to measure what the research plan is to study, not something else, and develop the concept or theory of the study. Internal validity refers to correct establishment of explanatory or causal relationships of the research studied, not any other study. External validity refers to the generalizability of findings from a particular study to other studies. Reliability refers to the repeatability of the case study.

Kvale (1996) discusses generalization and validity of qualitative research and offers three judgments. Naturalistic generalization refers to the judgment about the generalizability of research results based on the researcher's personal experience and tacit knowledge regarding participants, operations, and activities. Statistical generalization refers to the use of the formal notion of random sampling, estimating parameters and derivation of standard errors in qualitative research. Analytic generalization refers to the analytic generalizability based on an analysis of the similarities and differences between two contexts of study, and whether the results from one study can legitimately refer to another study. For validity, Kvale views validity as based on the postmodern world perspective. The modern world rejects the natural science model and the positivist notions of sciences which are normally adopt traditional positivist criteria for the judgment of truthfulness of statements. Postmodernism claims that there are many possible worldviews, truths, and criteria for truths (pluralistic truths). Kvale defines three forms of validity: craftsmanship validity, communication validity, and pragmatic validity. Validity as craftsmanship refers to the combination of research method and theory with researcher's character, integrity and scholarly record which is involved with the trustworthiness of research findings. Validity as communication refers to the demonstration of how texts are interpreted which focuses on the truth that can be tested through dialogue, and communication validity can be tested via the quality of an argument between claimed conflicts. Pragmatic validity involves change of the real world that happened as a result of the researcher's theory, propositions or actions. Change may occur by the induction of verbal and behavioral change.

Marshall and Rossman (1995) propose four criteria to measure the quality of qualitative research. The four criteria are credibility, transferability, replicability, and conformability, which is similar to Lincoln and Guba's (1985) trustworthiness. Credibility refers to the accuracy and completeness for identification and description of construct, theoretical process, and hypothetical entity of the phenomena under study. The accuracy and completeness of the phenomenon should derive from the participants. This is similar to the general internal validity in positivist science research. Transferability refers to the ability to generalize the research finding on two levels. The first level is generalization of research findings to the same population but of larger scope, and the other is the generalization of research findings to another population and setting. The first judgment focuses on the study's credibility, whereas the second judgment emphasizes the strength of the underlying theoretical arguments. Confirmability refers to the research findings by confirmable independent researchers and the need for the research to identify the procedures to minimize and eliminate the researcher's bias. Replicability is related to dependability, but Marshall and Rossman argue that qualitative research should be able to explain the dynamics and changes of research phenomenon. This flexibility is the main advantage for qualitative research. Marshall and Rossman claim that traditional reliability should not apply to qualitative research because qualitative research studies the changes of the social world. Therefore, the qualitative researchers should have explanations regarding the change process.

Maxwell (1996) argues that the elimination and discounting of alternative explanations of the researcher's inference will increase the inference validity. He presents three kinds of validity: description, interpretation, and theory. Description validity refers to the accuracy of what the researcher saw, heard, and experienced from data in order to minimize the threat of inaccuracy. Interpretation validity refers to the correspondence between the researcher and participants regarding the meaning and interpretation of research findings. Theory validity refers to the purposive discounting of alternative explanations for a theory from research findings.

Maxwell (2005) presents the concept of validity for qualitative research. He uses the term validity fairly straightforwardly and refers to validity as the correctness or credibility of description, conclusion, explanation, interpretation, and so on. The key concept of validity is the validity threat. Maxwell defines two common validity threats in qualitative research and provides a check list for a qualitative validity test. Researcher bias and reactivity are claimed by Maxwell as two sources of validity threats that commonly occur in qualitative research. Miles and Huberman (1994) mention that two reasons for research bias come from researchers always selecting theory that stands out for them and choosing data that fits with their existing theory or perceptions. Maxwell agrees that it is hard or impossible for the researcher to remove or eliminate personal values, expectations, theories, beliefs, and the perceptual lens that researchers bring to the study. Therefore, it is a crucial task for the research to identify and explain the possible biases and how to deal with those biases. Maxwell defines the term of reactivity as the influence the researchers bring to the setting of study. He proposes validity tests check lists, even though these check lists do not guarantee validity, because they are essentially important for dealing with the validity threats and increasing validity of research findings. The validity threats check lists include intensive or long-term involvement, rich data, respondent validation, intervention, searching for discrepant evidence and negative cases, triangulation, quasi-statistics, and comparison. Intensive or long-term involvement refers to long-term participant observation or the sustained presence of the researcher in the setting of the study. Rich data refers to data that are detailed and varied enough to provide a full and revealing picture of what is going on. Respondent validation is systematically soliciting feedback regarding data and findings from research participants in the setting of the study. The intervention of the researcher in qualitative research creates a change in the setting of the study which a simple correlation could never do. Searching for, identifying, and analyzing discrepant evidence and negative cases is significant for the logic of validity testing. Triangulation means collecting data from various sources by using a variety method to reduce risk of systematic biases and to promote enhanced explanations once developed. Quasi-statistics is the use of simple numerical results that can be readily derived from the data because in many cases qualitative studies have an implicit quantitative component. Comparison normally

occurs in multicase or multisite studies. The researcher may compare a single setting with a typical or similar setting. In addition, researchers may compare their experience with other or similar settings from a previous time or use the experience to identify the crucial factors and the effect that occurred during the study (Maxwell, 2005, p.110-113).

For naturalistic science, Lincoln and Guba (1985) posit credibility, transferability, dependability, and conformability as equivalent to internal validity, external validity, reliability, and objectivity. The naturalistic paradigm believes that trustworthiness is appropriate for the naturalistic axioms. The simple question for naturalistic trustworthiness is: "How can inquirer persuade audience (including self) that the findings of an inquiry are worth paying attention to, worth taking account of?"(Lincoln & Guba, 1985). Lincoln and Guba define credibility, transferability, dependability, and conformability as the criteria of trustworthiness. A comparison between positivist and naturalistic paradigms of the criteria and their corresponding questions is shown in Table 3.4.

Table 3.4:
Table of comparison of validity and reliability criteria between positivist and naturalistic paradigms

Positivist Paradigm	Naturalistic Paradigm	Criteria and Questions
Internal validity	**Credibility**	Truth value: How one can establish confidence in the truth of the finding of a particular inquiry for the subjects (respondents) with which, and the context in which, the inquiry was carried out?
External validity (Generalizability)	**Transferability**	Applicability: How can one determine the extent to which the findings of a particular inquiry have applicability in other contexts or with other subjects (respondents)?
Reliability	**Dependability**	Consistency: How can one determine whether the finding of an inquiry would be repeated if the enquiry were replicated with the same (or similar) subjects (respondents) in the same (or similar) context?

Objectivity	**Conformability**	Neutrality: How can one establish the degree to which the findings of an inquiry are determined by subjects (respondents) and the conditions of the inquiry and not by the biases, motivations, interests, or perspectives of the inquirers?

Source: Adapted from (Lincoln & Guba, 1985, p. 290, 300)

Credibility refers to the correction of research findings. The credibility can be created by implementing five techniques.

The first technique is a set of activities that are capable of producing creatable credibility of finding. The techniques are “prolonged engagement”, “persistent observation”, and “triangulation”. Prolonging the engagement requires the researcher to remain and be involved within the research setting long enough to overcome distortions of data and personal distortions, understand the context, and to build trust. Persistent observation attempts to identify the details of those characteristics and elements of the phenomena that are found in the study. If the prolonged engagement produces the scope, then persistent observation creates depth for the phenomenon. Hussey and Hussey (1997) state the use of different research approaches, methods, and techniques within a study is “triangulation”. Triangulation can overcome research bias and have a high level of credibility and reliability. Easterby-Smith et al. (1991) identify four types of triangulations as data triangulation refers to data having been collected at different times or from different sources within the study of a phenomenon. Investigator triangulation refers to different researchers collecting and conducting research separately under the same study of phenomena and comparing the results. Methodological triangulation refers to the mixed research methodology (quantitative and qualitative) which has been used in the study of phenomena, and triangulation of theories refers to theory being taken from one discipline and used to explain a phenomenon in another discipline.

The second technique is “peer debriefing.” Peer debriefing refers to the process of exposing oneself to a disinterested peer in a manner paralleling an analytic session

with the objective of examining aspects of the inquiry to ensure that the inquiry is not implicit only in the inquirer's mind.

The third technique for creating credibility is "negative case analysis." Negative case analysis refers to a process of revizing the hypothesis with hindsight.

The fourth technique is "referential adequacy" which refers to a form of recorded materials that can be referred to or examined at a later stage to check for the adequacy of data collection.

The fifth technique for creating credibility is "member checks". The member checks refer to the process of data, analysis, categories, interpretations, and conclusions being tested by the members from whom data are collected.

Transferability of the naturalistic paradigm differs from the external validity of positivist science because naturalistic researchers can provide only the thick description and set of working hypotheses with description of time and context in which they are found to relate. Lincoln and Guba (1985) argue that the task or responsibility for naturalistic researchers is to provide a database that allows transferability for the potential part of applications. Henwood and Pidgeon (1993) agree that it is difficult for qualitative research to have generalizability, as in positivist science. In qualitative research, the researcher can achieve transferability rather than generalizability. Henwood and Pidgeon suggest that the qualitative researcher can fully report on the contextual features of a study because transferability refers to the term of applying the findings of the study in similar contexts to that from which the findings are first derived.

Dependability generates credibility. Lincoln and Guba (1985) propose some techniques for creating dependability. The techniques are overlap method, which represents the kind of triangulation; stepwise replication, which builds on the classic notion of positivist science for establishing reliability; split-half, which requires an inquiry of two teams with a minimum of two people, each team conducting their

inquiry separately; and an inquiry audit in which an inquiry auditor examines the data, findings, interpretations, and recommendations.

Conformability is a result or product of dependability, and conformability can be achieved by implementing a conformability audit. The conformability audit is known as the audit trail. However, an additional technique for establishing overall trustworthiness is the keeping of a reflective journal. For Lincoln and Guba (1985) reflective journals refer to the kind of diary used on a daily basis or as needed. The reflective journal includes the daily schedule and logistics of the study, personal diary, and methodological log. The personal diary includes a written document or explanation regarding what is happening in terms of the researcher's own values, reflections, interests, and insights. A methodological log records the rationales or decisions about methodology.

Maykut and Morehouse (1994) apply the concept of trustworthiness in designing and carrying out their own qualitative research and also using the concept to evaluate other qualitative works. Drawing on their experience, they realize that these four techniques are very helpful for novice qualitative researchers. The four techniques are multiple methods of data collection, building an audit trail, working with a research team, and member checks. These techniques come from Lincoln and Guba's (1985) techniques for establishing trustworthiness which means the four techniques have been successfully used and adopted for increasing the trustworthiness.

Validity and reliability were known as the weakness of qualitative research. Therefore, to strive for action research validity and reliability, the experienced action researcher such as Kock (2004) applies multiple iterations of the action research cycle. Kock comments that there are three threats to action research and he believes that multiple iterations of the action research cycle assist the action researcher to increase action research validity and reliability. In this regard, the researcher also realizes and appreciates the significant benefit of applying multiple iterations into different organizations for many action research iterations.

3.9.2 Credibility, validity and rigorousness in action research

Greenwood and Levin (1998) define creditability of action research as " the argument or the process necessary for having someone trust research the research result" (Greenwood & Levin, 1998, p.80). According to Greenwood and Levin, there are two types of creditable knowledge. These are internal and external creditability. Internal creditability of knowledge refers to members of communities or organizations who accept that the theory has connection to the local situation and has a clear framework for the specific context. External creditability of knowledge refers to the ability to convince people who did not participate in the inquiry that the research findings are believable.

Greenwood and Levin (1998) believe that there are three challenges to creditability in action research. The challenges are workability, making sense, and transcontextual creditability. Greenwood and Levin treat workability as central because the action taken must result in a solution to the problem. They state that "we understand the inquiry process as an integration of action and reflection and the test of the tangible outcome as workability" (Greenwood & Levin, 1998, p.82). Making sense is the second challenge of action research. This challenge refers to sense-making of the tangible results and how the new knowledge from the outcome can be defined and given meaning in a constructive way. Action research requires some kind of testing system or procedures that the new knowledge undergoes until there is no further argument to overturn the explanation of new knowledge. The last action research challenge is transcontextual creditability. This refers to the ability of generated knowledge to be transferred to other situations.

Greenwood and Levin (1998) note that "the creditability-validity of AR knowledge is measured according to whether actions that arise from it solve problems (workability) and increase participants' control over their own situation" (Greenwood & Levin, 1998, p. 76).

Baskerville and Wood-Harper (2002) claim that action research has no less creditability than any other social science research. They present some strategies to increase scientific rigor while conducting action research. These strategies are the establishment of a formal research agreement, provision of a theoretical problem statement, planned measurement methods, maintaining collaboration and subject learning promoting iterations, and restrained generalization. Establishment of a formal research agreement refers to the use of consent and a disclosure agreement as part of the client-system infrastructure. The researcher should inform participants clearly regarding the nature of the research and the subject of study. Provision of a theoretical problem statement means the careful creation of a theoretical foundation which underpins the diagnosis. Planned measurement method refers to the researcher planning a methodological data collection method. There are several reliable data collection techniques such as audiotape observation, interview, participation, research diary, and monitor or watcher. Maintaining collaboration and subject learning means the researcher maintains good a relationship with the research partner. During the research cycle, there is learning from actions taken which leads to the modification of action research plans and cycles. The action research project finishes prematurely when there is no subject learning. Promoting iterations requires the repetition of action research cycles from planning, taking, evaluating, and reflecting. Reflections on the research cycle lead to richer learning and understanding of the studied context. Restrained generalization**,** according to the nature of action research, occurs when the researcher intervenes in a unique organizational setting; therefore, it is impossible for the research to be repeated. However, the researcher can circulate the findings to the scientific community for further study and correction (Baskerville & Wood-Harper, 2002, p. 141-144).

3.10 Justifications of validity and reliability

This section will summarize the techniques that have been claimed by some highly regarded qualitative researchers to enhance and improve the quality of qualitative research. However, the techniques that were discussed and summarized in the previous section may not all be suitable and appropriate for this study. The

researcher carefully selected those techniques that fit well with the nature of the research and the research context. As a result, the use of the selected techniques will increase and promote the quality of the research in terms of credibility, reliability, and trustworthiness.

3.10.1 Rigorous action research process

In order to create a rigorous scientific action research process, the researcher has adopted Baskerville and Wood-Harper's (Baskerville & Wood-Harper, 2002) strategies. The process commences with the establishment of formal research arrangements and agreements. The researcher arranged a formal meeting with the representatives on behalf of the research partner prior to beginning. The contents of the formal meeting include the purposes of the action research project, the procedures of the action research process, the key characteristic of an action research project, the consent form regarding the confidentiality issues and ethical aspects, and the negotiated outcomes for the organization and those expected of the organization. This strategy was to promote transparent understanding for both researcher and research partner so that both parties will have shared the common theme of the action research project.

During the introduction of action research, the researcher provided intensive knowledge regarding the action research process to all team members in order to prepare for the project and ensure that all team members understood the process and how team members perform and contribute to the project. The researcher provided theoretical knowledge based on the existing knowledge of Internet banking in order to prepare and provide background knowledge as input for the action research problem diagnosis process.

During the problem analysis stage, the researcher and team members performed problem analysis through team discussion. The theoretical knowledge was used as a guideline or framework for the scope and area of problematic issues. Team members applied their local knowledge, experience, and departmental problems and aligned

this with the existing Internet banking knowledge. At the end of diagnosis stage, team members generated the theoretical problem statement for this action research.

Rigorous action researcher plans methodological data collection methods. In general, action research has been claimed as unstructured data collection. Planned data collection methods will increase credibility of data collection. In order to keep a high level of reliable data, the researcher planned to adopt many techniques: observation, participation, team meeting materials, team meeting summary, team activities materials, postmeeting minutes, tape recordings, research diary, and value-free note-taking. All collected data could be retrieved and reexamined at anytime if needed during the data analysis process, providing referential adequacy. These two techniques will promote and sustain the claim of credibility and validity of the data collection.

Prolonged engagement and intensive or long-term involvement: These two techniques are significantly important for qualitative research, specifically for action research. Without spending a long period of time in the organization, it is impossible for the researcher to gain insight and understand the complex organizational problems. The researcher has an opportunity to understand organizational operation and problems. Also, the length of time that the researcher has spent with the team members means that trust and a good relationship between the researcher and team members will be established. Trust will generate high levels of effective cooperation and effective team performance.

Persistent observation is the result of prolonged engagement and maintaining collaboration. The adoption of this technique will provide an opportunity to understand insights of the phenomena of the research setting. It also helps the researcher to ensure and maintain the scope of the research and concentrate on the specific elements of study thus increasing construct validity based on Yin’s interpretation of research validity.

Maintaining collaboration is necessary for action research because action research involves participation and interaction between the researcher and team members in order to generate the action plans, implement, evaluate, and specify the learning from the implemented action plans. A number of cyclic processes during the action research process are called for before the results satisfy the team members. Therefore, to complete the action research process, the researcher needs to maintain cooperation with team members. At the same time, the researcher also needs to ensure the learning experience because without learning on the part of both action researcher and team members, the action research finishes prematurely.

The final technique for a rigorous action research process is action research protocol or case protocol based on Yin (1994). The adoption of research protocol will guide the researcher through the research process, and then the research process can be repeated by an independent researcher in a similar or different context. However, for the results of the research findings there is no guarantee for the generalizability because qualitative research, especially action research, is context-bound and addresses real-life problems in a particular organization. However, this technique promotes reliability and replicability of the research process.

Therefore, resulting from the discussion of planned techniques for the action research process, the researcher has confidence that some levels of research validity and credibility have been created during this action research process.

3.10.2 Validity and Reliability Data Analysis Process

In order to achieve validity and reliability in the data analysis process, the researcher plans to implement a data management scheme within the data analysis process. Both Levine (1985) and Wolfe (1992) believe that data management is an integral part of data analysis. Data management is significant for adding reliability, and reliability of the data analysis process because without data management, data can be easily miscoded, mislabeled, mislinked, and mislaid (Wolfe, 1992). Data management promotes and provides data storage systems, a high quality of accessible data and

retention of data during and after the data analysis process (Miles & Huberman, 1994). I addition to data management, the researcher adopts the coding protocol or coding scheme. The idea behind using coding protocol is to increase repeatability. This provides the systematic coding procedures for another researcher to follow; therefore, the coding procedures can be repeated and followed by other researchers. The development of coding protocol or a coding scheme will increase the reliability and repeatability of the coding process (Miles & Huberman, 1994).

3.10.3 Credibility and Trustworthiness Research Findings

To achieve trustworthiness, the researcher must be able to answer the questions raised by Lincoln and Guba (1985): How can inquirer persuade audience (including self) that the findings of an inquiry are worth paying attention to, worth taking account of? and the question by Greenwood and Levin (1998) as to the argument or the process necessary for having someone trust research result.

The researcher plans to manage Greenwood and Levin's two types of creditable knowledge of action research. Internal creditability of knowledge refers to members of communities or organizations who have accepted that the theory has a connection to the local situation and have a clear framework for the specific context. External creditability of knowledge refers the ability to convince people who do not participate in the inquiry that the research findings are believable.

In order to validate and justify the research findings, in this case the main contribution or research finding is the effective Internet banking development framework or theory or model. The effective Internet banking development process was extracted from the action research process during the year 2004 while the researcher was a participant within the team for improving the Internet banking development process. The researcher is obliged to confirm with the team members that the outcomes of this action research process have a significant influence on solving immediate organizational problems and establishing organizational control

over the problems and situations. The creditability-validity of action research knowledge is “measured according to whether actions that arise from it solve problems (workability) and increase participants’ control over their own situation” (Greenwood & Levin, 1998, p. 76).

After the team members (research participants) have been accepted and confirmed for the performances or contributions to the action research process, the researcher justified and consolidated the frameworks of the effective Internet banking development process and then presented the consolidated framework to team members for respondent validation and member checks. These two techniques allow the data, analysis, categories, interpretations, and conclusions to be tested and examined by the members from whom the data are collected. This achievement will increase the internal creditability of the research findings.

3.11 Summary

This chapter presents an overview of the research guidelines and overview to guide this research. The research paradigms, research method, and data analysis are justified. Further detail of data analysis procedures will be presented at the beginning of Chapter 5: Research Findings. The data analysis procedures section will demonstrate how the researcher conducted the data analysis and produced the research findings. The next chapter will present the data gathering process of Internet banking maintenance and modification phase process improvement.

Chapter 4 Data Gathering and Data Analysis

This chapter comprises two main parts: data gathering and data analysis. The data gathering section will explain how the researcher plans to collect data. The other section will explain how the researcher designed the data analysis procedure.

4.1 Data gathering procedures

4.1.1 Chronology of action research on Internet banking maintenance and modification process improvement process

This action research project on Internet banking maintenance and modification process improvement process commenced with determining and approaching the action research partner. This search took 3 months from November 2002 – January 2003. The preparation and introduction for this action research was conducted during December 2003 and January 2004 in order to establish team members and educate them regarding action research.

The action research on the systems improvement process had five steps: problems identification, action plans formulation, action plans implementation, action plans evaluation, reflection and validation from team members. The action research process took 10 months to complete. Step 1 began in February 2004 and step 4 was completed in October 2004. The final step was reflection and validation of learning conducted during February and March 2005. The chronology of Internet banking maintenance and modification process improvement action research is shown below:

Action research preparation

Step 1: Approaching research partners

November 2002 – January 2003

Step 2: Action Research Preparation and Introduction

December 2003 – January 2004

Internet banking maintenance and modification process improvement action research

Step 1: The problems identification process

February 2004 – March/April 2004

Step 2: The action plans formulation process

April 2004 – May 2004

Step 3: The action plans implementation process

June 2004 – August 2004

Step 4: The action plans evaluation process

September 2004 – October 2004

Step 5: The reflection and validation of process improvement

February 2005 – March 2005

4.1.2 Action research partner

The action research preparation process has two main steps. The initial step was to approach a research partner. The other step was preparation and introduction with the research partner. The process of approaching research partners took 3 months from November 2002 – January 2003. The researcher attempted to approach a Thai commercial bank to be a research partner. It took two attempts to successfully secure research partner. The action research preparation and introduction took approximately 2 months during December 2003 – January 2004.

4.1.2.1 Research partner search: First attempt

At the beginning of the research partner approaching process, the researcher needed to identify Thai commercial banks which offered Internet banking services. In 2003, there were approximately 13 international and domestic commercial banks that offered Internet banking services to their customers. The majority of Thai commercial banks offered basic features and functions of Internet banking: account balance, internal fund transfer within bank, and bill payment. The main objective for

the cooperation between the researcher and a commercial bank was to develop and enhance the existing Internet banking development process. The researcher conducted preliminary research on prospective research partners. The researcher established criteria for approaching prospective research partners. After conducting preliminary research on Thai commercial banks and Internet banking in Thailand, the researcher found an article by Ongkasuwan and Tantichattanon in 2002. The authors had conducted a comparative study of Internet banking in Thailand; the researcher used their research findings to develop criteria for approaching research partners. The criteria included banks which offered various Internet banking features and functions, banks which had awareness of Internet banking services in Thailand, banks which rated and ranked as top Internet banking services in Thailand, and banks with which the researcher had networks and connections. The first three criteria were adopted from Ongkasuwan and Tantichattanon (2002) and the final criteria was established based on the possibility of capitalizing on the researcher's connections with Thai commercial banks. The table of criteria for approaching research partners can be seen in Appendix A1.

From these criteria, six banks were identified as leading Internet banking services providers: Thai Farmer Bank Public Company Limited, Siam Commercial Bank, Bangkok Bank Public Company Limited, Bank of Ayudhya Public Company Limited, Thai Military Bank, and Bank of Asia Company Limited.

However, the researcher found that there were only three commercial banks that matched with researcher's four criteria. Bangkok Bank Public Company Limited, Bank of Ayudhya Public Company Limited and Bank of Asia Company Limited were the top priority banks to approach as a research partner. Between them, these three banks offered a broad range of Internet banking services and were the leading Internet banking service providers. When the researcher evaluated the possibility based on the approach criteria, three of them were as equivalent. The major distinction was the level of connection with the three prospective banks. The researcher had a different degree of connection with them. The researcher had strong connection to one of the

top management level of Bangkok bank through family business, while there were connections to the other two banks through former colleagues.

In the initial attempt, the researcher approached Bangkok Bank Public Company Limited as a research partner. The reason for approaching Bangkok Bank as research partner was not only that the researcher had the strongest connection with Bangkok Bank but also Bangkok Bank was one of the leading Thai commercial banks in Thailand with a long established history in terms of trust from customers, number of branches both domestic and international, image and reputation of the bank, and stability of business. As a result, the researcher approached and secured Bangkok Bank as his research partner. The top management at Bangkok Bank introduced and arranged for the researcher to meet with the Information Technology manager for an initial meeting. The meeting went very well and the researcher was asked to wait for further confirmation and a meeting in which to make a formal presentation to the Internet banking department.

After the initial meeting with Information Technology manager, the researcher waited for 2 months for further communication from Bangkok Bank. There was no sign or confirmation from Bangkok Bank for further discussion. The researcher had approximately 3 months to select the research partner. There was a time limitation regarding returning to New Zealand at the end of January 2003. Therefore, the researcher had a month to approach another potential Internet banking research partner.
The delayed discussion with Bangkok Bank and the time limitation forced the researcher to search for a new prospective research partner.

4.1.2.2 Research partner search: Second attempt

The researcher was not totally successful in his first attempt to secure a research partner. Having only 1 month before returning to New Zealand, the researcher had an urgent need to search for a new research partner. This time constraint placed enormous pressure on the researcher because without a research partner, there would be no opportunity to conduct this research.

The researcher needed to approach the other two commercial banks where the researcher had connections to the Internet banking development unit. These commercial banks were Bank of Ayudhya Public Company Limited and Bank of Asia Company Limited.

The researcher contacted his friend who had a connection with Bank of Asia and made contact with his previous colleagues who work for Bank of Ayudhya. On one day, there was an opportunity to present the research proposal and conduct initial discussions with Bank of Ayudhya in the morning and Bank of Asia in the afternoon. Both banks were interested in participating in Internet banking maintenance and modification process improvement action research. The researcher decided to wait for 7to 10days before making contact for further discussion.

After 7 days, contact was made with the vice-president (VP) of e-Strategy e-Commerce and e-Banking Division of Bank of Asia and the VP was interested in being a research partner. The researcher promptly made an appointment for further discussion. During the formal meeting with the vice-president, the researcher discussed and informed him about the process of action research, the timeline of the action research, and the expected outcome of the research. There was no requirement to sign a confidential agreement with Bank of Asia. However, the researcher and the vice-president verbally agreed about ethical issues and Bank of Asia accepted the role of research partner. The researcher agreed to keep all information during the course of the action research as confidential information. The relationship between the researcher and Bank of Asia developed in a positive atmosphere. However, after the researcher agreed to conduct action research with Bank of Asia, Bangkok Bank asked the researcher to engage in further discussion for Internet banking action research. The researcher had already accepted and agreed with Bank of Asia for Internet banking action research. Therefore, the researcher decided to maintain good relationship with Bank of Asia and conduct the research with it.

4.1.3 Action research preparation and introduction

During 2003, the researcher maintained and kept in touch regularly with the VP while in New Zealand. Returning to Thailand in November 2003, he contacted the VP to arrange for the initial meeting with him. Unfortunately, December is the holiday month in Thailand. Many staff take holiday leave or annual leave. This situation had a major effect on the initial meeting about this research project. Several key members, including the VP and the prospective members, were on holiday or on annual leave; consequently, the initial meeting was postponed until mid- January. The researcher spent 2 months during December 2003 – January 2004 in action research preparation.

4.1.3.1 Action research preparation

The purpose of the meeting was to create clear understanding of the action research project by providing an overview of action research, research scope, research contributions, research timeline, Internet Banking Development Team (IBDT), and action research intervention change techniques. In the initial meeting with the VP, the following content had to be clarified and discussed.

- Action research was introduced and explained. Action research as a research methodology was explained with a brief definition The nature, key characteristics and the cyclic process of action research were presented.
- Overview and scope of this action research project were explained.
- The researcher needed to explain how this action research would be conducted.
- The expected research contributions were discussed.
- The timeline for the action research project needed to be established.
- The first meeting with IBDTs needed to be arranged.
- The action research intervention change techniques were explained and agreement for them was sought from the VP.
- The Internet Banking Development Team (IBDT) needed to be established.

- IBDTs are the cross-functional team which included people from related departments regarding Internet banking development (Technique 1: Departmental participation).
- IBDTs have equal right to participate during team meetings (Technique 2: Equal participation).
- The systems thinking approach was used as an approach for Internet banking development problem-solving (Technique 3: Systems thinking).
- The VP as management needed to provide sufficient support to IBDTs (Technique 4: Management support).

From the initial meeting, the VP agreed and approved the action research intervention change techniques to be implemented during the Internet banking development process improvement action research. The VP accepted and agreed to establish an IBDT as an Internet banking development team. The IBDT consisted of six team members and they were selected from Internet banking development related departments. He IBDT included:

- IBDT 01 - Web Designer and E-commerce Specialist
- IBDT 02 - Systems Auditor/UAT Unit/Call Center and Customer Relationship Division Manager
- IBDT 03 - Senior IT Project Specialist
- IBDT 04 – Vice-President of e-Strategy e- Commerce and e-Banking Division
- IBDT 05 - Call Center/Customer Service Officer
- IBDT 06 - Research Facilitator, Observer, and Team Members

The outcome and atmosphere in the first official meeting with the VP were positive and energetic. The IBDT was established and the VP had agreed and accepted all agreements regarding the action research process. The vice-president was very excited about commencing the action research process and keen to achieve the research contributions in term of improvement of the Internet banking development process.

4.1.3.2 Action research introduction

The first meeting was crucial as it was the first time the researcher met with all the IBDT members. The researcher realized that it was necessary to build trust, make connections, and make a good impression on team members as quickly as possible. The relationship and attitude of team members were also significantly important for further cooperation on this research. The success of this research project relied on the cooperation between the researcher and the team members. Therefore, the researcher had to create a sense of belonging and being accepted as one of the team members. The researcher also had to create the image of a trusted, well-educated and capable person who had the ability and capability to facilitate and conduct this research. The first impression of the researcher was one of the most important key success factors for good cooperation during the course of the action research project.

The researcher knew that in Thailand and Thai culture present-giving was a good strategy to build connections, create a good impression, and establish initial relationships. Presents from overseas which can not be bought in Thailand were perceived as valuable and precious. The researcher realized the impact of present-giving and so brought some presents from New Zealand. The presents did not have to be valuable in terms of money but they needed to look attractive enough to make a good impression. The researcher believed that the presents from New Zealand would create a good impression and satisfaction among team members.

Present-giving may have assisted the researcher not only to establish the initial connection and relationship, but also to create trust and a sense of belonging. The researcher needed to demonstrate not only an extensive knowledge of Internet banking but also the ability to facilitate and lead team members through the action research process.

At the beginning of the first IBDT meeting, the researcher introduced himself to the team members and distributed souvenirs from New Zealand. Then the researcher presented some brief general information on his educational background and the purpose of the meeting. The first interaction with team members was the exchange of

general information regarding their names, organizational job titles, and responsibility for Internet banking development. It was surprising that some of the team members were not known to each other; they looked like strangers to each other. Team members may have known another person's name but not had an opportunity to meet and interact.

Using a Powerpoint presentation, the researcher then presented and again introducted the concept of action research, as with the first meeting with the VP. The researcher explained and discussed all aspects of action research with team members and encouraged them to ask any questions regarding this project. After the introduction to action research, the researcher briefly summarized extant knowledge on Internet banking. The researcher presented the factors that have significant impact on IB following the ideas of Sathye (1999), Tan and Teo (2000), and Suganthi et al. (2001). The researcher also presented that the idea some previous researchers such as Suh and Han (2002), Mukherjee and Nath (2003), and Rexha, Kingshott, and Shang Aw (2003) had found that trust has a significant impact on IB adoption.

IBDT members were informed about the four action research intervention change techniques and encouraged to utilize their opportunity to participate throughout the duration of this research. Initially, IBDT members agreed and planned to have team meetings every 2 weeks. The IBDT members were also asked for their permission for the researcher to mention their names and use their dialog and contributions during team meetings and discussion for research findings and discussion.

After the introduction to action research, the researcher asked team members to engage in their first team participation and activities. The task for team participation and activity was a brainstorming session on Internet banking problems. The researcher asked the following question "What were the factors that affect Internet banking adoption in Thailand?" They were asked to base their contributions on their work experience and opinions. The researcher believed that each team member came from a different working context; each team member would have difference perceptions and opinions regarding the factors affecting Internet banking adoption.

The researcher distributed blank paper to all team members for this brainstorming activity. The team activity took approximately 20 minutes. All answer sheets were collected by the researcher who summarized the factors affecting Internet banking adoption and presented the results in the second meeting.

This was the first time for the researcher to meet IBDT members. At the beginning of the first meeting, IBDT members, with the exception of the VP, looked uncomfortable, and suspicious of the researcher. This atmosphere caused the researcher to be slightly nervous at the beginning of the first meeting.

During the first meeting, the atmosphere changed gradually; IBDT members felt more comfortable and relaxed. The relationship between the researcher and team members was slowly developed after the introduction to action research. The introduction of action research went well; all team members understood their roles and responsibilities in the action research process and team members also foresaw the perceived benefits of conducting this action research project.

4.1.4 Action research: Internet banking maintenance and modification phase improvement

The Internet banking systems modification and maintenance process improvement consisted of five main steps which were adopted and adapted from Susman and Evered's (1978) action research model. The four action research intervention techniques were implemented and utilized at all times during the action research process. The five Internet banking maintenance and modification process improvement steps were:

- Step 1: The problem identifications process
- Step 2: The action plans formulation process
- Step 3: The action plans implementation process
- Step 4: The action plans evaluation process

- Step 5: The reflection and validation learning process

4.1.4.1 Step 1: Problem identification process

During the problem identification process, there were three objectives behind using the factor model as an identification tool. The first objective was for team members to identify and clarify problems and factors that affect Internet banking adoption. Individual team members were asked to do brainstorm problems and factors affecting Internet banking adoption, drawing on their own experience. The second objective was to assist team members to foresee a holistic view of Internet banking adoption's problems and factors. The last objective was that the factors model encouraged team members to share their experience and opinions with other team members. This problem identification phase took approximately two and half months, from February 2004 to April 2004.

It was significant for team members to see the whole picture of the problems and factors affecting Internet banking adoption, not only from their own departmental perspective. The factors model based on individual team members contributions was combined and summarized then combined and categorized into some major categories to become factor model version1. The first version needed further modification and agreement from team members. The model contained factors and problems from all related departments which were team-based problems or factors other than departmental problems or factors. The information from each team member was combined and counted for its frequency. Based on team members' experiences, 27 factors affecting Internet banking adoption in Thailand emerged. The summary table of these factors can be found in Appendices A2 and A3.

Initially, it was decided to collapse these 27 factors in three broad categories: systems, users, and marketing. In each category, each factor was prioritized based on the frequency of appearance. Factors which scored more than three times were named first priority factor. The factors which scored twice were named second priority, while the factors mentioned once were named third priority. The summary of the

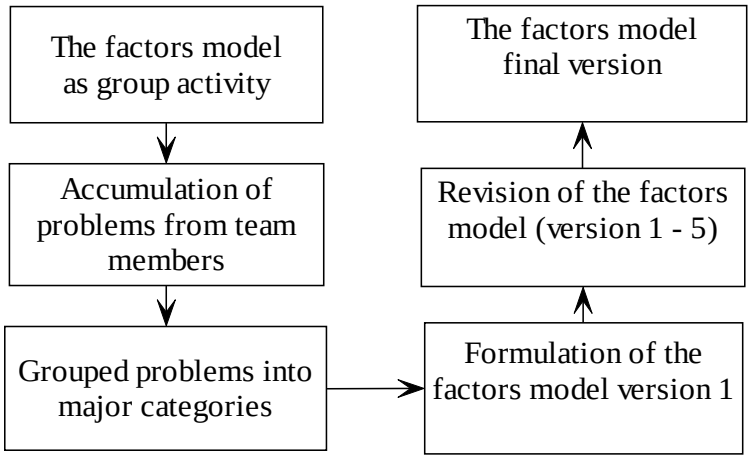
factors affecting Internet banking adoption in Thailand based on IBDT experiences and the factor priority can be seen in Appendix A2.

The summary table of the factors affecting Internet banking adoption and the summary of three teams and factor priorities were distributed to all team members. Unfortunately, the second meeting was postponed because some key members had an emergency meeting. Therefore, the researcher took this opportunity to ask team members to formulate their departmental vision, mission, objectives, strategies, and action plans in order to address the factors model in discussion in the second meeting.

The IBDT members worked and participated well together as a team. It was the first time that all related departments had come to work together as an Internet banking development team. The process of problem identification went well, and all IBDT members participated vigorously. The information from the factors affecting Internet banking adoption had been analyzed and the initial factors model for Internet banking adoption in Thailand (the factors model version 1) was created. This model was modified by changing interface to application. As a result, the modified factors model (the factors model version 2) consisted of application, marketing, Internet, trust, users, and systems. The model was further revised several times during the next meetings. In the factors model version 5, the term Internet was defined as an uncontrollable factor team and added to the category of culture. Therefore, the latest version of the factors model was version 5, which can be seen Appendix A5. The summary table for the development of the factors model from version 1 to version 5 is presented Appendix A4.

Figure 4.1:

Problem identification process



4.1.4.2 Step 2: The action plans formulation process

The researcher and team members believed that all the factors needed to be addressed in order to increase the number of Internet banking users and usage of Internet banking. The first part of the second meeting was used for the factors model discussion. The objective of the discussion was to revise the initial factors model. The agenda for the second meeting was divided into two parts. The first part focused on the modification of the factors model and the other half concentrated on the formulation of strategies, action plans for addressing the factors model. This step took approximately 6 weeks from mid-April until May 2006

The second meeting was put off. The researcher had asked IBDT members to formulate their departmental vision statement, mission statement, objectives, and action plans. And so the researcher took the responsibility to combine all vision statements, mission statements, objectives, and action plans and group all these together in order to create a team vision statement, mission statement, and objectives. All action plans from all related departments were combined and were placed into different categories in order to address problems and factors in the factors model. Repetitive and similar strategies and action plans combined and merged into strategies and action plans.

During the third meeting, team members went through all the action plans together and agreed that these action plans addressed the factors model. Team members decided that all of the action plans needed project owners and action priority. IBDT members discussed the project owners of each individual action plan. The action plans required a project owner, priority of action, resources, measurement, and linkage to factors. The creation of milestones and timelines was also necessary. The assigned project owner and priority action plans were named action plans version 1 or APs1.

The objectives and agenda of the fourth meeting were to identify linkage between the factors model and action plans, establish a rollout date for each action plan, determine the evaluation date for each action plan, realize requested resources for action plans implementation, and formulate the measurement criteria. These were named action plans version 2 or APs2. The rollout date, evaluation date, required resources, and measurement tolls were added into action plans and labeled action plans version 3 or APs 3. During the fourth meeting, IBDT members justified the rollout date, required resources, evaluation date, and measurement tools and kept the justified version as action plans version 4 or APs 4. The researcher checked for the unattained factors and found that there were several factors which did not have an action plan. Team members worked together to formulate the additional action plans for unattained factors. The additional action plans were added into the action plans version 4.

In addition, for action plan version 5, during the fifth meeting, individual action plans had been assigned code based on the five categories in the factors model; for example, the category of trust the first action plans was called T1 and in the second action plan, T2. The applications category, the first action plans were called A1 then A2, and A3 . . . A (n). The action plans in marketing category were called M1, M2, M3 . . . M (n). For the users' category, action plans were called U1, U2, U3 . . . U (n). The last team was systems; action plans in this category were called S1, S2, S3 . . . S (n). This was the first time that all action plans were assigned identity codes. It was the primary key for each action plan.

The sixth meeting started with a review of the action research process. The purpose was to remind and identify team members that we were in the action plans formulation step of Internet banking maintenance and modification process improvement action research. There were several critical issues to be addressed and discussed. The top four concerns involved rollout date, evaluation date, number of action plans, and requested resources. The questions to be answered were:

- Do we have too many action plans? If so, how can we implement all the action plans?
- Could all action plans be implemented at the same time?

All action plans were to start and finish at different points of time; some action plans had high level of risk involved, and some were predecessor action plans. Some were implemented and evaluated in a short period of time; some had to be postponed until Phase II of AsiaCyber Banking services had been launched, and some had an uncertain rollout date.

The sixth meeting was the crucial time for this action research because the sixth meeting had been rescheduled twice because there was an issue of the changed ownership of a new business partner. All projects needed to wait for the new policies and strategies from the successor which was an investor from Singapore. The initial plan for launching Phase II had been delayed from the end of the second quarter to the fourth quarter of 2004. The delay of Phase II had significant impact on these action research projects. Phase II was the major Internet banking services enhancement.

Due to the major delay of Phase II, the project had to adjust the process and procedure to cope with the current situation. Therefore, some action plans had to combined or eliminated. Some action plans from version 5 were merged with other similar action plans and some action plans were eliminated altogether. The summary of action plan development is shown in Table 4.1.

Table 4.1:

S*ummary of major features of action plans development*

Versions	**Key features and development of action plans**
Version 1	Action plans assigned based on project owner and linked to the early version of factor models. The plan priority added to every action plan.
Version 2	Action plans still based on project owners. Rollout date, required resources, and measurement tools added.
Version 3	Action plans still based on project owners. Evaluation date added. Rollout date, required resources, and measurement tools redefined and justified. Additional action plans were added to this version.
Version 4	The categories of action plan switched from project owners to categories based on the factors model. Codes were assigned to all action plans as their primary key. Project owner was added into the same column of priority. Required data was added. Measurement tools were justified based on availability of data.
Version 5	Action plans assigned based on the factors model categories. Some action plans eliminated because of change of partnership period and some action plans merged into similar action plans. Timeline established in order to monitor the implemented action plans, current, concurrent and future action plans.
Version 6	Action plans assigned based on the factors model categories. The sequences of implementation based on the project timeline.

The action plans version 6 was the latest action plans. IBDTs decided that the action plans version 6 needed to be transformed into the action research timeline. The timeline for action plans implementation can be seen in Appendix A6.

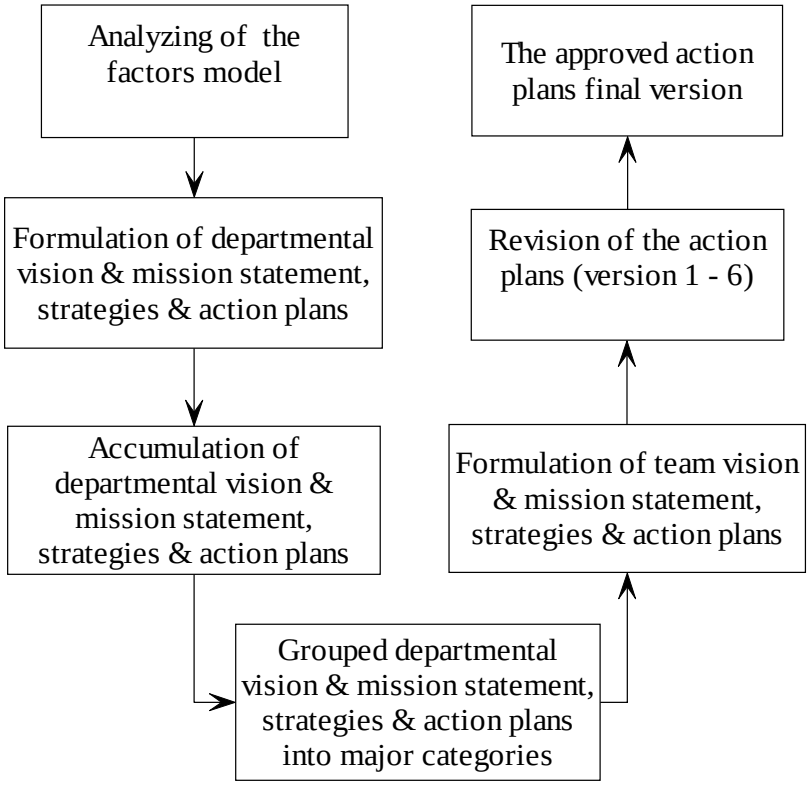
The process of action plan formulation was well developed. There was a great discussion on the modification and revision of the factors model, which had been revised gradually. The action plans were linked coherently with the factors model and were well developed and accepted by team members, even though there was a major interruption during the action plans formulation because of the changeover to a new business partner. All projects within Bank of Asia were stopped. The Internet banking development process was also significantly affected. The target of launching of

AsiaCyber Banking services Phase II was heavily affected and postponed for a long time. There was no confirmation about the future direction of Internet banking services. A large number of action plans were delayed and eliminated. However, IBDT members reacted and responded well to the sudden change and uncertainty.

The modification of the factors model created a sophisticated and solid knowledge regarding Internet banking adoption and provided clear direction for Internet banking future development. The factors model transformed departmental knowledge into shared knowledge or team knowledge. In addition, it recorded all shared knowledge in a written document. The rock-solid factors model helped the IBDT to formulate accurate and sophisticated action plans. The IBDT created a timeline of action plans. This timeline assisted team members in monitoring the progress and sequence of action plans. The factors model, action plans, and timeline promoted and provided a high level of control over the project, which helped IBDTs implement action plans effectively and smoothly

Figure 4.2:

The action formulation process



4.1.4.3 Step 3: The action plans implementation process

The action plans implementation process was confronted with several difficulties. Some of the action plans had been implemented for a certain period of time; some were implemented parallel to the others; some needed a long time to implement; some took a long time to develop the enhanced features and functions, and some needed to wait for the launch of AsiaCyber Banking services Phase II which had been delayed. There was no official rollout plan for Phase II.

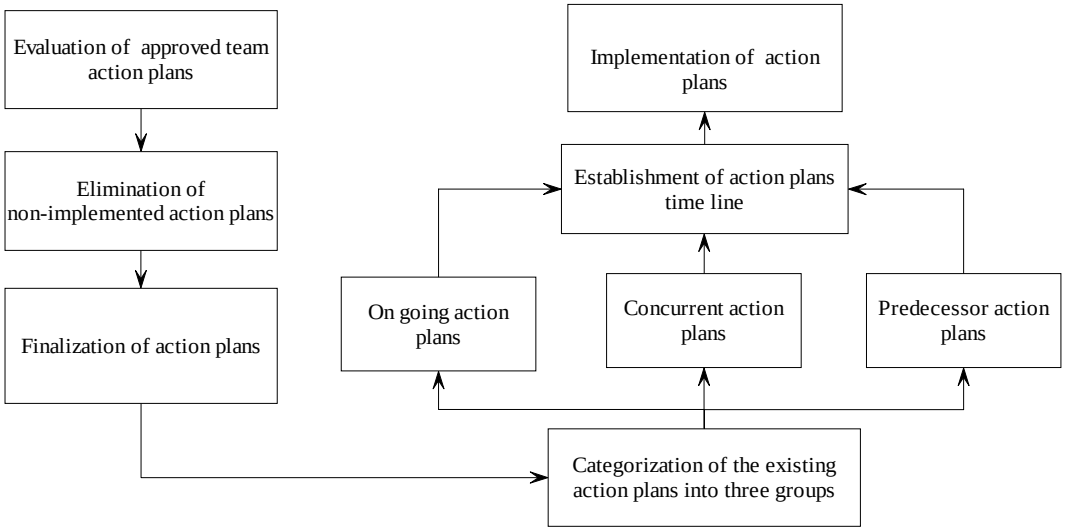
In the middle of the action research process, there was a major change within Bank of Asia. Bank of Asia was searching for a new business partner. Therefore, there was no permission from Bank of Asia's board of directors for any investment and development within Bank of Asia which had to wait for new policies and strategies from the new business partner. Some of the current projects had been stopped, or cancelled, and there were no future projects to be developed. In terms of the Internet banking development process case, some of the plans required substantial investment; they were paused and awaiting new direction. All action plans needed to be carefully selected for implementation; some urgent plans were allowed to continue and be implemented. The implementation of action plans was totally interrupted but urgent plans and those that had begun implementation were allowed to be completed. The implementation of existing action plans was based on the latest version, action plan version 6.

To implement the existing and selected action plans, team members needed to create action plan timelines because some were ongoing, some were concurrent, and some were predecessor plans. The timeline assisted team members to control and manage the implementation more effectively. The action plan timeline can be seen in Appendix A6. One of the most important factors for the implementation of a successful Internet banking development process was the support from the organization and management team. The organizational policy and strategies always had a significant impact on the direction of the Internet banking development team.

Therefore, team members needed support from the organization and top management in order to achieve the improvement of Internet banking services.

Figure 4.3:

The action plan implementation process



4.1.4.4 Step 4: The action plan evaluation process

The action plan evaluation process was an indication of the improvement and effectiveness of the Internet banking maintenance and modification process. Many action plans had been successfully implemented. It was clear that the Internet banking system operated more smoothly than had the prior action research project. In terms of Internet banking development team, members were satisfied with the improvement of the Internet banking maintenance and modification operational process. There was an increase of Internet banking users, Internet banking transactions, and a reduction in customer complaints.

In order to evaluate the effectiveness of the implemented action plans, team members and the researcher decided to conduct customer semistructured interviews in order to receive feedback from bank customers; these interviews were valuable and beneficial for further Internet banking development and improvement. The results and feedback from the interviews could be used as the source of data for the evaluation of the implemented action plans. In addition, the feedback from bank customers was

triangulated with the previous statistical data of Internet banking systems performance.

4.1.4.4.1 Statistical data of previous Internet banking systems performance

The previous performance of Internet banking systems was used as a benchmark or measurement for indication of improvement. The previous statistical data from IT and customer services were compared with current Internet banking systems performance. IT and customer service were regularly reported to the vice president each month. The 3 years' previous records were compared with the current performance on a monthly basis. This method and the improvement of Internet banking systems performance will be identified and the improvement used as data for triangulation with bank customer feedback on the improvement of Internet banking systems.

4.1.4.4.2 Semi-structured Interview with bank customers

The team members assigned the researcher the role of conducting semistructured interviews with bank customers. To conduct these interviews, the researcher needed to develop semistructure questionnaires for the semistructured interview, prepare the interview questions and search for organizations where interviewees could be interviewed. Some conditions needed to be addressed; the organizations interviewed needed to be bank customers and employees needed to be paid by Bank of Asia payroll. The VP contacted and appointed three organizations for semistructured interviews. Two of the organizations were IT based and one was nonIT based. The researcher needed to visit all three organizations in order to discuss, prepare, and arrange the in-depth interview schedules. The researcher planned to conduct two in-depth interviews with about 6 weeks between them. Prior the interview sessions, the researcher conducted many pilot tests, and during the interview sessions, took notes for each interview.

The interview was an informal, semistructured interview between the researcher and interview participants. The interview participants were asked questions regarding Internet banking usage, opinions, and suggestions. All interview participants were

informed that there were no right or wrong answers. The researcher attempted to create a relaxed and friendly atmosphere during the interview sessions. There were lots of laughs and smiles between the researcher and interview participants. Thai people prefer not to express their feelings and opinions, especially on topics with which they do not feel familiar and comfortable. The interview participants were encouraged and persuaded to discuss, answer, and participate during the interview sessions. On some occasions, the interview participants answered questions incorrectly. As a result, the researcher needed to take time to explain and clarify questions for participants.

For the semistructured interviews, the researcher utilized instruments and equipment such as codes and colors, note-taking sheets, and interview reflection sheets. For the assigned colors, NonInternet banking users (NIB) were assigned pink, Activated Internet banking users (AIB) was assigned orange, and Inactivated Internet banking users (IIB) was assigned green. There were 16 AIB interview participants, only one IIB participant, and 32 NIB interview participants. In each group, the individual interview participant was assigned a code; for example, in the NIB group the first interview participant was assigned NIB 01, the second NIB 02, up to the last participant who was assigned NIB 32. During the interview process, the researcher completed note-taking sheets for each interview participant and at the end the interview participant's reflection was completed.

There were several reasons for using interview as method for evaluation data collection. First, the researcher wished to know the demography of interview participants. Secondly, the researcher liked to know about participants' Internet usage, Internet literacy, computer literacy, and Internet banking usage. Thirdly, the researcher planned to investigate Internet banking users' Internet banking usage problems. Fourthly, the researcher attempted to uncover the reasons for Internet banking adoption and nonInternet banking adoption. Fifthly, the researcher wanted to investigate participants' opinions regarding Internet banking. Finally, the researcher planned to identify the factors affecting Internet banking adoption based on Internet

banking users in Thailand. The following section describes the interview questionnaire format.

First Interview

Every interview started with the collection of participants' demographic data regarding age range, educational level, occupation, computer literacy, Internet literacy, Internet experience, frequency of Internet usage, average time of Internet usage, and frequency of Internet banking usage. The questionnaire consisted of four parts: Part 1: Collection of general information regarding Internet banking usage; Part 2: Collection of information regarding the reasons for Internet banking adoption and nonInternet banking adoption; Part 3: Investigating the participants' opinions on statements about Internet banking usage; Part 4: Discussion of the factors affecting Internet banking in Thailand based on interview participant opinions. The structure of the first interview can be viewed in Appendix B3.

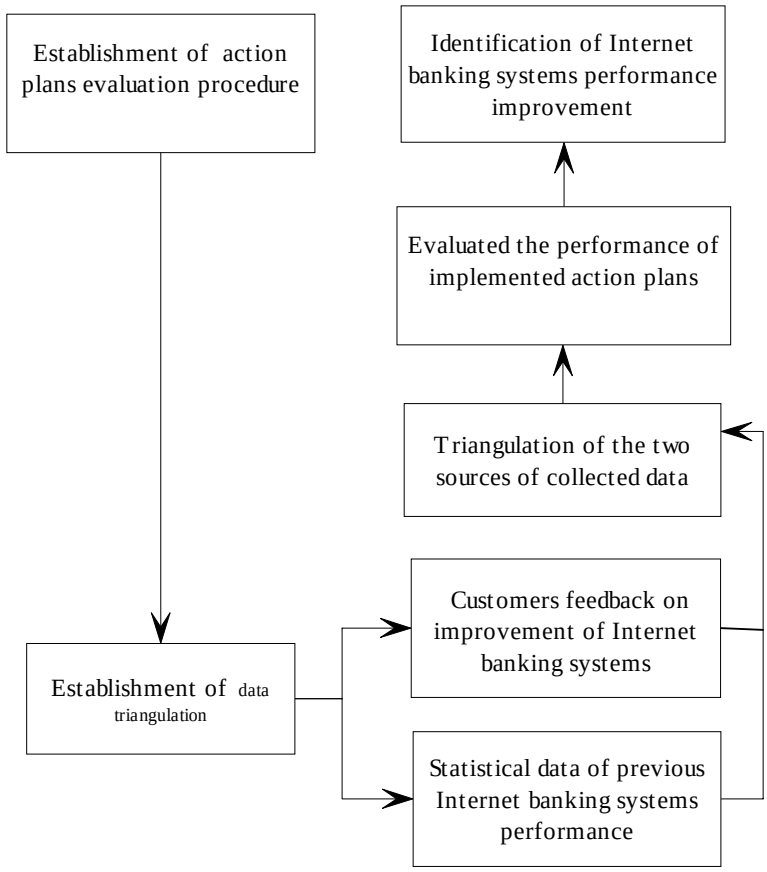
Second Interview

The objectives for the second interview were that semistructured questionnaires would confirm all the results from the first interview, reveal the number of bank customers who had switched from traditional to Internet banking, discover the reasons for switching to Internet banking of NIB team, and examine the performance of implemented action plans based on customer satisfaction levels for Internet banking services. The structure of the second interview can be viewed in Appendix B4.

The interviews went well for both sessions. Team members received real feedback from bank customers. It was significant to be able to interview both existing Internet banking users and nonInternet banking users because team members had an opportunity to understand bank customers' reasons for adoption and nonadoption of Internet banking. The feedback from bank customers regarding Internet banking systems improvement and satisfaction levels was used to evaluate the performance of implemented action plans. The summary of the interview results can be viewed in Appendix B5.

Figure 4.4:

The action plans evaluation process



4.1.4.5 Step 5: Reflection and validation of process improvement

Reflection and validation were undertaken to evaluate the performance of the four intervention change techniques and the overall achievement of Internet banking maintenance and modification process improvement. The researcher interviewed team members individually regarding the contributions of interventional change techniques, the improvement of Internet banking maintenance and modification process, the change in Internet banking development process, and the performance of action research and the researcher. The success and performance of this action research project was measured by how team members valued the benefits of the Internet banking maintenance and modification process improvement. Therefore, the researcher planned to interview team members for their reflections on the introduction of four interventional techniques, on the improvement of Internet

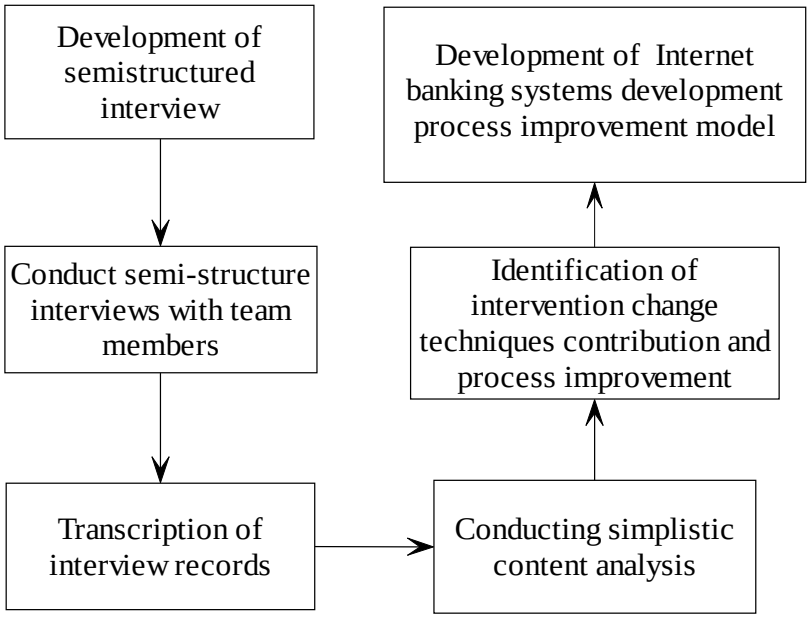
banking development process, and on team members' learning experiences. The researcher planned to conduct semistructured in-depth interviews with all the remaining team members. Three team members still worked for Bank of Asia. Two team members had resigned and changed workplace, so the researcher needed to find the contact details for these two team members and arrange a time for their interviews. The researcher managed to interview one of those who had moved to another commercial bank. The researcher contacted the remaining three team members and arranged times for the reflective interviews. There were four reflective interviews. They took between 45 and 90 minutes each. There were three main parts; the first was about the team members' general information, the next part focused on the impact of the four intervention change techniques on Internet banking systems modification and maintenance process improvement, and the final part covered the area of the team member's learning experience and the research intervention. Team members were asked to reflect on and recall from memory the whole process of the Internet banking maintenance and modification process improvement project. The semistructured interview questions can be seen in Appendix B2.

During the reflective interviews, team members confirmed that the four interventional techniques created a significant impact on the Internet banking development process. The factors model provided a systematic structure for factors and problems of Internet banking adoption. This factors model assisted team members to formulate accurate and effective action plans. The departmental participation provided good opportunities for team members to realize and understand the scope of the Internet banking maintenance and modification process. In addition, there was an opportunity to share knowledge, expertise, and problems among team members. Equal participation promoted a high quality of discussion and team members had good opportunities to express their ideas, comments, opinions, and suggestions. Team members worked as a team which created a sense of ownership, team support, good relationships, and good communication. Systems thinking generated systematic problem structure. Problems were solved as the whole system's, rather than departmental, problems. The overall performance of the Internet banking development process was that it was more effective than previous processes. There

was an improvement in terms of quality action plans formulation speed, accuracy of action plans, the end-to-end or systems approach problem-solving, and the relationships among related departments. The reflective interviews went well and smoothly. Team members felt good with the whole Internet banking maintenance and modification process improvement. Team members had a good impression of the process and the learning experiences. The atmosphere during all reflective interviews was positive and relaxed, with team members responding spontaneously and vigorously. They were satisfied with all the improvements and contribution of Internet banking action research project.

Figure 4.5:

Reflection and validation of process improvement



4.2 Data analysis procedures

Generally, there is no consensus on the form of qualitative data analysis. Several qualitative researchers and authors present a variety of strategies, methods, approaches, and procedures for qualitative data analysis. Unlike quantitative research

analysis, there are no clearly agreed rules and procedures for analyzing qualitative data (Spencer, Ritchie, & O'Connor, 2003). The different traditions and epistemological assumptions of research have different forms of analysis process and focus on different contributions. The qualitative data analysis procedures vary from researcher to researcher and author to author, as the methodology of qualitative data analysis is a highly personal activity (Jones, 1993). Therefore, the researcher decides to construct his or her personal design for data analysis procedures. The procedures for this qualitative data analysis process comprise four main parts: data collection, data management, data analysis, and data display.

4.2.1 Data collection

The researcher decided to adopt semistructured in-depth interview for data collection. After leaving the research site on October 2004, the researcher returned in April 2005 to conduct reflection interviews for the Internet banking maintenance and modification process improvement. There were six team members within this action research project including the researcher. Two out of five team members resigned and changed their workplace. The researcher managed to conduct an interview with one of these.

In total, the researcher had four team members available for semistructured in-depth interviews. Three out of four were interviewed at the research site and the team member who had resigned was interviewed at Starbucks in her workplace building. The other three team members were interviewed in the meeting room which is a good size room and has a meeting table. The atmosphere of the meeting room is suitable for conducting interviews. There is sufficient light and it is an air-conditioned and quiet room. Both the researcher and team members felt relaxed and comfortable during the interview session. The researcher recorded the interview session and wrote short notes during the interview. All interviews went well and team members recalled and reflected extremely well on their memories of the whole Internet banking maintenance and modification process improvement. Team members are assigned an individual code, for example, IBDT 01, IBDT 02, IBDT 03, and IBDT 04. The content of the interviews can be seen in Appendix D1.

4.2.2 Data management

The purpose of data management is to establish a research database for qualitative research. There were a small number of interview participants; however, each interview lasted approximately 60 to90 minutes, producing approximately 30 to 50 pages of transcripts. The original transcripts have been saved and will remain untouched. A copy of the transcripts was manipulated and managed in several patterns to support data analysis.

Huberman and Miles (1998) argue that data management associates and integrates with data analysis. They describe data management as the systematic and coherent process of data collection, storage, and retrieval. Data management aims to create high quality and accessible data, documentation for data analysis, and retention of data. Data storage and data retrieval are the significant issues in data management because without data management, data can be easily miscoded, mislabelled, mislinked, and mislaid. Good data management provides the ability to store, retrieve, and keep track of what and where data are and what data are available.

4.2.1.2.1 Transcribing and translating the interviews

In the initial step of qualitative analysis procedures, the researcher listened to all the tape recorded during the interview sessions and read through all interview observation notes. All the interviews, field notes, and meeting minutes was transcribed verbatim and the hard copy printed for further proof-reading and sense-making.

4.2.2.2 Organizing and managing collected data

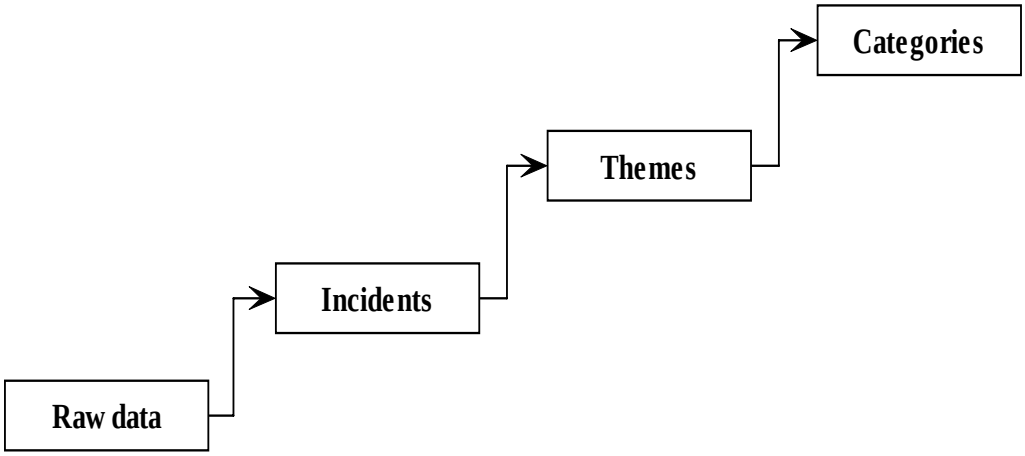
After all tape recordings were transcribed; each transcript was manipulated into two versions of transcripts, that is, transcripts based on team members' sections by questions. The original copies of the three transcript versions were saved into a research database. There is only copy of version on which it is allowed to make changes, cut, paste, and edit. All the modified versions also are saved into the research database under different folders.

4.2.3 Data analysis

This research uses an action research approach originally developed by Jan Robertson (1995). The data analysis approach adopts action research for the data collection method for the in-depth interview and participation as, and a variation of, grounded theory as a data analysis method to develop the theoretical models. This combined grounded theory action research approach uses the principle of the hierarchy of data. The data analysis process commences with a first level analysis of the raw data from the interview transcripts, then moves on to a higher level of data analysis into incidents, themes, and categories. The hierarchy of data diagram is showed in Figure 4.6.

Figure 4.6:

The hierarchy of data



The hierarchy of data

4.2.3.1 Open-coding

After organizing and managing data, the researcher read through all the transcripts for understanding and to search for the main ideas in the transcripts. Marshall and Rossman (1999) believe that reading through the data and becoming familiar with the people, events, and quotations is important for the initial stage of data analysis. At the same time, the researcher wrote memos or short notes beside the transcripts because these are essential for qualitative research and help the researcher not only capture

analytical thinking on collected data, but also facilitate the process of thinking and stimulating analytic insight. The researcher had to make sense of the whole body of data by carefully reading through all transcriptions and writing memos or notes as ideas came to mind (Tesch, 1990). At the end of the sense-making process, the researcher needs to gain a broad picture of research themes and discover some emerging key terms in order to develop a list of codes for further data analysis.

The steps in the open-coding phase of the research are:

- Read through all transcripts and sense the broad view of research phenomenon;
- Highlight these prominent research incidents;
- Create terms to represent research incidents from transcripts; and
- Make short notes to represent these research incidents.

4.2.3.2 Establishing coding rules

It is necessary for the researcher to develop a codebook or coding scheme (Neurendorf, 2002). Within this research, the researcher needs to develop a new coding system instead of using an existing coding system (Smith, 2000). Coding categories and dimensions should be defined explicitly and clearly, so the different coders or researchers can agree on what material is included and not included in categories (Weber, 1985). Therefore, when the researcher applies the coding rules to a variety of text, this yields formal comparable results over time and the comparability leads to the cumulating of research findings (Weber, 1985, p.41). Coding rules will explain how to apply the coding systems, and how to distinguish units. The encoding process requires the explicit "code" and all codes in the study integrate into a codebook (Boyatzis, 1998). As a result, the researcher will establish explicit rules for coding text in order to create the perfect coder reliability. The common characteristic of coding systems is to provide general guidelines for the classification of verbal material together with an example such as "Do not infer the presence of emotion on the basis of the setting or activity in which the character is engaged" (Hall & Van de Castele, 1966, as cited in (Smith, 2000). The coding rules or coding protocol for this research takes a simplistic version of coding rules. The emergent and prominent terms from the sense-making process were added and used

as guidelines for coding. The researcher carefully read through transcripts line by line. Where new terms appeared, these new terms were added to the existing lists. The initial terms or codes can be seen in Appendix D2.

- Establish lists of prominent research incidents or propositions as code books, and
- Assign code for prominent terms, as seen in Appendix C1.

4.2.3.3 Coding raw data

All transcripts are arranged by question. For each question, there are four answers for the four team members. They are arranged by question rather than by team member in order to identify the similarities and contrasts of opinions of team members based on each question. The transcripts based on questions were analyzed and highlighted with highlighting pen during the coding process. The code books from the sense-making process were used as guidelines for coding. However, new propositions or incidents were added into code books. An example of how the transcripts are coded and highlighted can be seen in Appendix D3. However, the researcher also counted the frequency of propositions that are coded in order to see the significances of those propositions. The example of coding with frequency can be seen in Appendix C2.

- Apply the code books to all transcripts;
- Prominent research propositions are coded based on code books; and
- Records the number of codes which appeared in each question.

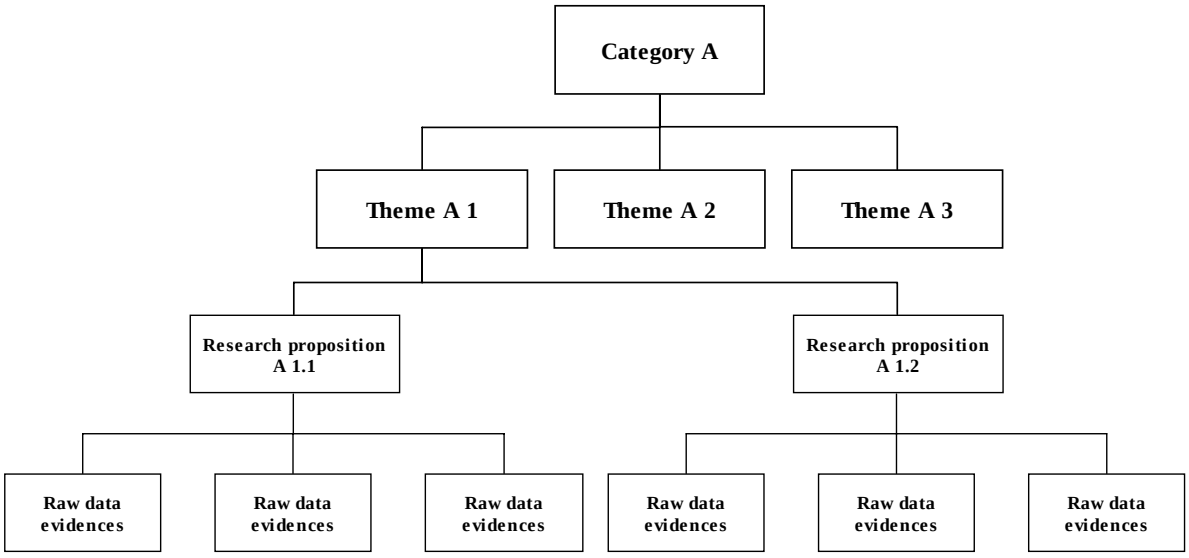
4.2.3.4 Developing analytic propositions, themes, and categories

Once all transcripts are coded, the next step is to organize all codes and allocate them in the same group under the same themes. The researcher breaks all codes into smaller pieces of data and combines them into the same group based on code books.

- Manipulate and arrange all coded incidents and propositions into themes;
- Search for similar and supportive themes to be located under the same categories; and
- Provide the source of reference of direct quotations.

Figure 4.7:

Development of categories, themes, and propositions



4.2.3.5 Consolidating themes and categories

After all research incidents are managed and grouped into themes, the next step is to discover the emergent themes that are supported by research propositions. From the research themes level, the related themes are combined and grouped in order to discover research categories.

- Combine the similar research propositions under the same themes; and
- Combine the similar themes under the same categories.

Once research categories are formed and well established, the similar themes will be merged and combined and some themes may be deleted if those themes do not support the categories well. At the categories level, categories can be merged and combined into closed categories, in the case where the merged categories make more sense than previous categories. For this research, the researcher commences with five broad categories and at the end of the data analysis process the number of categories is reduced to four. Many research themes are deleted and moved to the other research themes that make strong support for categories.

- Delete repeated propositions and themes if necessary; and
- Establish the final categories which are represented by research themes and propositions.

4.2.4 Data display

4.2.4.1 Summary model of research categories

At the end of each research category, the summary model of research categories will be presented in order to summarize the research category. The model shows the major research themes and propositions and the effects of interventional techniques.

- Create summary model to summarize research themes under each category.

4.3 Summary

This Internet banking maintenance and modification process improvement was conducted using action research. The four interventional change techniques were introduced to team members. The four techniques were departmental participation, equal participation, systems thinking, and management support. These four techniques were applied through the whole process of Internet banking maintenance and modification process improvement. There were many significant changes in the process, for example, problems structured from departmental problems to team problems, high level of cooperation and participation among Internet banking development team members, structured problem-solving approach, complete skills and expertise for Internet banking development, effective strategies and accurate action plans, learning experience among team members, and good relationships between related departments. There was evidence for the improvement of the Internet banking maintenance and modification process, and a significant increase in Internet banking transactions and Internet banking users. The team members were satisfied with the improved Internet banking maintenance and modification process and they confirmed that there was a significant learning experience and improvement in Internet banking operational process. Team members were delighted with the significant improvement of Internet banking maintenance and modification process and the performance of Internet banking team members. It was seen in the reflective

interview that the majority of team members were satisfied and realized that there was improvement and transformational change of the Internet banking maintenance and modification process.

Chapter 5 Research Findings

This chapter has two main parts: data analysis procedures and some key research findings. The data analysis procedures for this research cover data management and data analysis. The data analysis will combine techniques in order to establish the data analysis suitable for this qualitative research. The chapter begins with the qualitative data analysis procedure in specific detail in terms of how the researcher manages his semistructured interviews, and analyzes those collected data. The second part will present the key research findings in four major categories: departmental participation, equal participation, holistic scenario, and management support. The research findings from data analysis will be presented.

This action research project showed an improvement in the Internet banking maintenance and modification process which was significantly influenced by the interventional change techniques and the Internet banking maintenance and modification process improvement model. This model provided team members with a structured model for problem-solving while the interventional change techniques assisted team members in changing the process. The main objectives for this research are to identify the impact of the interventional change techniques on the process improvement and the process of Internet banking maintenance and modification process improvement. The researcher interviewed team members regarding their opinions of and reflections on the process. The majority of team members realized that there had been change and improvement in the process. The findings revealed that the action research process of organizational development had a major influence on the ways team members operated, communicated, and developed Internet banking systems. This action research has also achieved some significant outcomes in terms of the Internet banking development process, increased Internet banking transactions, and the increased number of Internet banking users. There are four research categories identified from data: departmental participation, equal participation, holistic scenario, and management support. Each of these categories confirms several themes, and under each theme research propositions emerged which are discussed with supportive evidence from the data. Each category will be discussed in sections of 5.3 to 5.6.

5.1 Departmental participation

Departmental participation refers to the participation of team members who come from different departments and have different expertise and responsibilities regarding the Internet banking maintenance and modification process. This process needs cooperation from various departments to operate, develop, and maintain Internet banking systems. Therefore, it is necessary to establish a cross-functional team for participating in and coordinating an Internet banking development process.

Prior to the action research process, the researcher had a discussion with the vice-president of e-Strategy e-Commerce and e-Banking Division (the VP) and found that the previous Internet banking maintenance and modification process had been conducted independently. There was no involvement and participation from all related departments. The vice-president distributed and assigned work to all related departments based on the flow of the Internet banking operational process. When the assigned work finished, the work was passed back to the VP who then passed on the finished work to the next departments along following an Internet banking hierarchy operational process.

During the action research process, the findings indicate that departmental participation technique generated several significant contributions for Internet banking maintenance and modification process and team members. The themes that emerged during the action research process are that departmental participation promotes good communication and relationships; creates diversity of expertise; changes the structure of problems; and creates a team orientation.

5.1.1: Departmental participation promotes good communication and relationships

Good communication and relationships refer to team members communicating effectively and efficiently with each other. Smooth and friendly communication promotes good relationships among team members. As a result, good communication and relationships create an effective Internet banking operational process. There are two propositions from the data that supported this theme. These propositions are:

- 5.1.1.1: Departmental participation eliminates lack of communication and communication problems; and
- 5.1.1.2: Departmental participation generates good relationships, direct and face-to-face communication, friendship, and a sense of belonging.

5.1.1.1: Departmental participation eliminates lack of communication and communication problems

Communication among team members plays a significant role in the Internet banking development process, because this requires a high level and degree of involvement from all related departments. The separation of work and ineffective communication create a high possibility for communication problems and communication Breakdowns, for example, delayed communication, distorted messages, uncompleted messages, and messages lost during communication.

In the previous Internet banking maintenance and modification process, all related departments worked separately and were controlled by the VP who comes from the marketing department. The VP passes all assigned and allocated work to all related departments based on the hierarchical flow of Internet banking modification and maintenance process. The VP performs a distributor role during the development process. In this situation, many problems occur, and there is a limited opportunity for all related departments to talk to each other. In the rare case, some departments do have an opportunity to talk, but it is not face-to-face discussion and the discussion does not include all related departments in the development process. One team member who works as a customer service manager raised this problem during the reflective interview, saying "*I have no chance to discuss with other departments and also in rare case, I have little chance to talk but it is not all departments at once*" (IBDT 03/Q1.1). The previous Internet banking development process did not use face-to-face communication and direct communication with the other related departments.

The other potential communication problem is the loss of messages during the long communication and operation process. An IT support manager shares her personal

example about communication problems between her department and customer service department. "*Some problems from Asia Phone departments do not come to IT support; they are lost during the long communication and operation*" (IBDT 03/Q2.1). The message takes a long time to come from sender to receiver. In some cases, the messages are lost during transportation. Therefore, departmental participation creates a good communication channel by providing team members with an opportunity to discuss issues openly and directly so the communication problem that is accidentally caused by an ineffective Internet banking development process is solved. Departmental participation provides and creates the streamlined working context that allows all related departments to meet and discuss issues with each other. This is one of the major contributions of departmental participation. The communication problems between related departments are eliminated.

5.1.1.2: Departmental participation generates good relationships, direct and face-to-face communication, friendship, and sense of belonging

At the beginning of this action research project, the researcher realized that during the first meeting that all team members attended, they seemed like strangers to each other; there was no personal contact, communication, and eye contact with each other. Team members did not really know each other well. However, some team members had probably heard each other's names, but there had been no opportunity to meet for discussions regarding their work. The introduction of action research introduced each team member to the entire team. Participation during all group meetings and group activities gave team members a good opportunity to know and become familiar with each other. Good communication among team members also promotes good relationships because team members know and understand each other. The departmental participation provided team members with a communication channel for Internet banking maintenance and modification.

It is interesting to see the impact of departmental participation in the Internet banking maintenance and modification process. There was an interesting significant outcome during action research process; departmental participation promoted good

communication and relationships among team members because team members understood each other in terms of their problems and working contexts. Team members also gained more understanding regarding procedures and problems of Internet banking systems. They could provide suggestions and recommendations and help each other to solve problems. The good understanding and supportive environment promoted good communication and relationships between related departments. The open discussions among team members created good communication and relationships between team members. Team members explained their feelings about departmental participation creating good relationship. One team member's comments illustrate this:

> *When team members come from different departments and discuss their problems openly with other team members the team members will realize and gain more complete problems and understand each others' problems and operations which help team members work well together and have a good understanding between related departments. This promotes good communication between department and good relations between team members.*
>
> *(IBDT 03/Q2.4)*

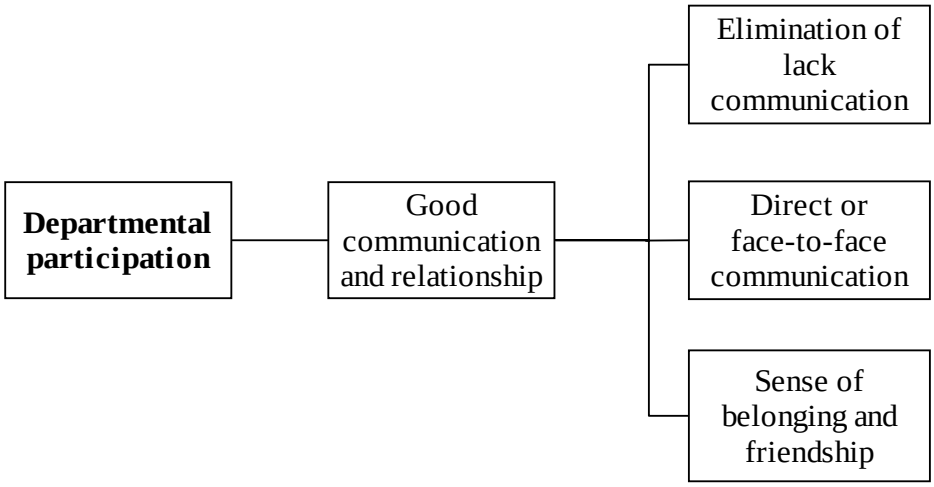
There were additional interesting contributions from the good relationships among team members, for example, further development of a sense of belonging. Team members had more patience. When a team has good relationships between team members they feel that they are part of the team. They are friends. This sense of belonging enables team members to have more patience. There is a nice, easy, and relaxed working environment which is directly created by the supportive teamworking environment, "*When we feel that we are in the same team we have a sense of belonging and have more patience with each other*" (IBDT 02/Q4.5). The sense of belonging and feeling patient are major factors in creating the good relationships that promoted effective team performance.

The departmental participation provided a good opportunity for the Internet banking development team to have good relationships and communications which created good understanding of the Internet banking development process. Smooth and effective operation was the outcome of good understanding.

Team members created friendships during departmental participation; they became friends because they work together and know each other. In contrast, the previous Internet banking development process team members worked separately and had no chance to participate and know each other. They performed work based on their responsibilities. The team leader explains the relationship between friendship and team performance; "*When they do learn from each other they become friends; this will create smooth cooperation; this helps teams work together and perform well*" (IBDT 04/Q4.6).

Therefore, good relationships and friendships create good team performance. Team members understand each other's working contexts and develop a sense of belonging and friendship. These are the key driving forces for effective team performance.

Figure 5.1:
Summary model of good communication and relationship theme



5.1.2: Departmental participation creates diversity of expertise

Diversity of expertise refers to a team that has a broad range of skills and expertise within itself. Departmental participation is vital for the Internet banking maintenance and modification process because departmental participation provides diversity of

expertise to Internet banking development team and the process of Internet banking maintenance and modification involves and requires a broad range of knowledge and skill to develop Internet banking services. There are two propositions from the data which supported this theme. The two propositions are:

- 5.1.2.1: Diversity of expertise offers a complete set of skills for the Internet banking systems modification and maintenance process; and
- 5.1.2.2: Team members worked effectively and accurately when the Internet banking maintenance and modification team implemented team evaluation and cross-checking.

5.1.2.1: Diversity of expertise offers a complete set of skills for the Internet banking maintenance and modification process

Diversity of expertise refers to a team that has a broad range of skills and expertise within the team to perform Internet banking maintenance and modification. There are three main departments in the Internet banking maintenance and modification process: marketing department, IT/operation department, and customer services which includes User Acceptance Test unit (UAT). These related departments have their own unique skills and expertise. In the previous process, there was no involvement in the Internet banking maintenance and modification process and they worked separately and independently. Each department performed its required tasks based on the instructions from the VP who came from the marketing department. A team member from IT support shares her previous Internet banking experiences:

> *Previously, the Internet banking development team did not work with many departments and they work separately. Therefore, we have a limitation of expertise within Internet banking development.*
>
> *(IBDT 03/Q3.1)*

A team member, who works as a web designer, points out that it is vital for the Internet banking maintenance and modification team to consist of people from related departments within the Internet banking development areas because there is much related work to be shared between many departments in the Internet banking systems modification and maintenance process. Therefore, there is a need for the Internet

banking maintenance and modification process team to have various skills and expertise in order to achieve high performance.

> *Every process for Internet banking design and development involves many people. It can not be said that interdepartmental help creates diversity of expertise; it is a must for the Internet development team to consist of people from different departments which relate to Internet banking services.*
>
> *(IBDT 01/Q3.1)*

The different departments have different viewpoints for their decision-making. IT people use an IT viewpoint, and the web designer uses a web developer's viewpoint, but customer service uses their viewpoint for evaluation of the functions and features. Different departments use different views to make a decision. It is significantly important to have interdepartmental teams within the Internet banking maintenance and modification process. This team member feels confident that diversity of expertise is significantly important for the Internet banking maintenance and modification process because people who work in each related department have different skills and expertise based on their working context. The Internet banking maintenance and modification team has to gather people from all related fields to work together as a team. This team definitely needed a complete set of skills and expertise to develop Internet banking services. Another team member also confirms that the team has a variety of skills and expertise when all the related departments come to work together. She stated:

> *The team consists of people who come from different departments who have different working experience and expertise. The team will have various expertise within the team. There is a variety of expertise among team members.*
>
> *(IBDT 02/Q3.1)*

Therefore, the Internet banking development team has a complete set of skills and expertise to develop sophisticated Internet banking services. The team has a capability to analyze and formulate effective strategies for Internet banking maintenance and modification. The team leader always told the researcher that two heads are better than one. He agrees that more involvement from many departments

creates a better performance. He admits that when people who have different expertise work together, they will have a complete set of skills. The performance may not be perfect, but it is better than individual work or that of two people or two departments (IBDT 04/Q3.2). The Internet banking maintenance and modification team consisted of people from all related departments who had various skills and expertise "*we will have complete skills and expertise to do good work*" (IBDT 02/3.2). The ability and capability to perform good work were the outcomes of the expertise, knowledge, and skills that each member brought to the team. "*Team members will bring in their expertise to the team; this will create the variety of skills and knowledge within the team*" (IBDT 03/Q3.1).

The quality of strategy and action plan formulation relies on the quality and number of team members. Previously, all the strategies and action plans were formulated by the marketing department; there was no involvement from other related departments. Therefore, there was possible to have narrow viewpoints and lack of important information from other departments. The people who formulate strategies and action plans are simply and purely concentrated on their interpretation based on their work experience and departmental problems. These strategies and action plans may not address the problems of other related departments.

It is one of the most important requirements for the Internet banking maintenance and modification process is to have equal participation because team members need to share information and knowledge in order to solve the team problems and achieve the team objectives. One of the team members insists that it is "a must" for a Internet banking development process to have departmental participation and equal participation.

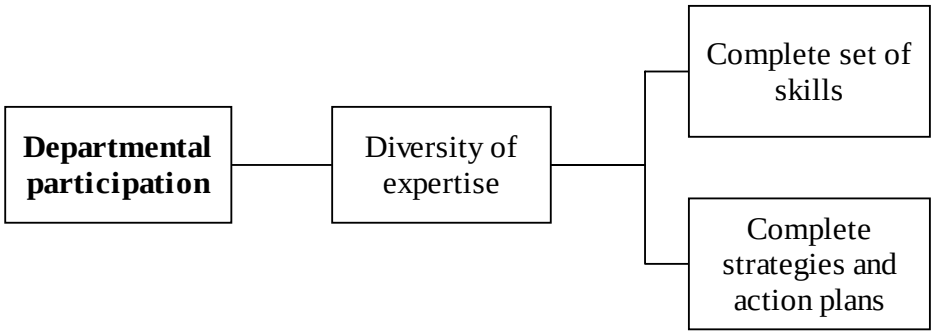
> *It is also when people come to work as a team, they share all knowledge, information and their experience in order to achieve the team's objective and solve the same problem. It is a must for Internet banking development team to consist of people from different departments.*
>
> *(IBDT 01/Q3.3)*

Finally, the operation of the Internet banking maintenance and modification process is connected to and involves all related departments. The Internet banking development team performs the complete loop of the Internet banking maintenance and modification process. The vice-president of e-banking strategy illustrates this, noting that

> *The team that we set up is a complete operation, it starts from customer's register via operation, uses the systems via IT, complaints via customer service and call center, and develops new website via web design. So the team will have all skills and experts to develop Internet banking services.*
>
> *(IBDT 04/Q3.1)*

In summary, it is certain that the diversity of expertise is significantly important for Internet banking development because the Internet banking development process is involved with many departments and requires a high level of cooperation from related departments. The majority of the Internet banking maintenance and modification team members believe that a variety of skills and expertise create a high quality of strategies and action plans because all strategies and action plans covered team problems well. Each team member brings his or her expertise to solve the team problems. All problems are addressed at the same time and are tackled by the experts.

Figure 5.2:
Summary model of diversity of expertise theme



5.1.3: Departmental participation changes structure of problems

Changed problem structure refers to a change in the way that problems with the Internet banking maintenance and modification process are handled and solved. The structure of problems is transformed from departmental problems to group problems. The problems are solved by mans of a whole process rather than departmental processes. One proposition from the data supports this theme. The proposition is:

- 5.1.3.1: Structure of problem changes from a departmental to a team problem.

5.1.3.1: Structure of problem changes from a departmental to a team problem

The departmental participation completely changes the structure of the Internet banking development process. There is no passing finished work to related departments. It is time-consuming and a waste of time to pass on all finished work. The Internet banking development process can be enhanced or improved by utilizing departmental participation. All related departments come to work as a team and make all decisions as a team. Work is distributed to the project owner straightaway. Team members complete their part by completing a part of the whole system. An effective Internet banking development process was generated during the action research process. The team leader admits

> *When you want to solve the problem, problems can solved one time- finish because all required members are included in the team. If we do not have a team, work needs to pass around related departments, which is a waste of time and creates ineffective operation. (IBDT 04/Q3.1)*

Previous Internet banking development processes did not have a formal team structure. The Internet banking development process was dominated by the marketing department and the VP. The marketing department gathered information from related departments and formulated all strategies and action plans. This information gathering process has some limitations regarding the scope of operational problems and departmental problems. The strategies and action plans are possibly

focused on and heavily addressed the marketing department's problems. Therefore, the action plans lacked inputs from the other related departments.

In terms of action plan contributions, the action plans will not create significant contributions for the whole Internet banking system. One team member from the marketing department admits that, previously, the Internet banking development process was done by a few people and did not include all the related departments. This shows that the previous Internet banking development process had a lack of other departments' inputs. She states

> *We are not doing this activity in terms of brainstorming from all members. The information comes from a small team of people only. The process is me who gathers all information from staff, then formulates to factors which does not involve everyone in related work who come and work together as a team.*
>
> *(IBDT 01/Q1.1)*

Therefore, there was no information gathering from related departments and no brainstorming for inputs from related departments.

Many contributions result from departmental participation; there is the opportunity for all related departments to know each other, to be familiar with each other, to collaborate with each other, to help each other, and to share problems, knowledge, ideas, information, vision, experience, objectives, directions, and benefits of successfully implemented action plans. However, the major benefit of departmental participation is an opportunity for team members to share their departmental problems. In the previous Internet banking development process, the related departments worked separately and there was no opportunity for people to contact other departments and share their departmental problems. The majority of the team members mention that they had no involvement with Internet banking problem-solving and decision-making. They performed their work as an obligation and under instructions from the marketing department. There was no discussion and participation between the related departments.

After the Internet banking maintenance and modification team was established, the people from related departments were appointed to be part of the team. All these members represented their department and used their experience and expertise. Team members came to work together as a team. They participated and shared their departmental problems regarding Internet banking operations. Every team member shared their departmental problems with other team members. This way, each team member understood the scope of others' problems regarding the Internet banking development. One of the team members stated "*If we have a chance to talk face-to-face we will* ***inform about all the problems*** *that we have regarding Internet banking services*" (IBDT 03/Q2.1). This implies that sharing of departmental problems definitely increased and expanded the scope of the problems of Internet banking development.

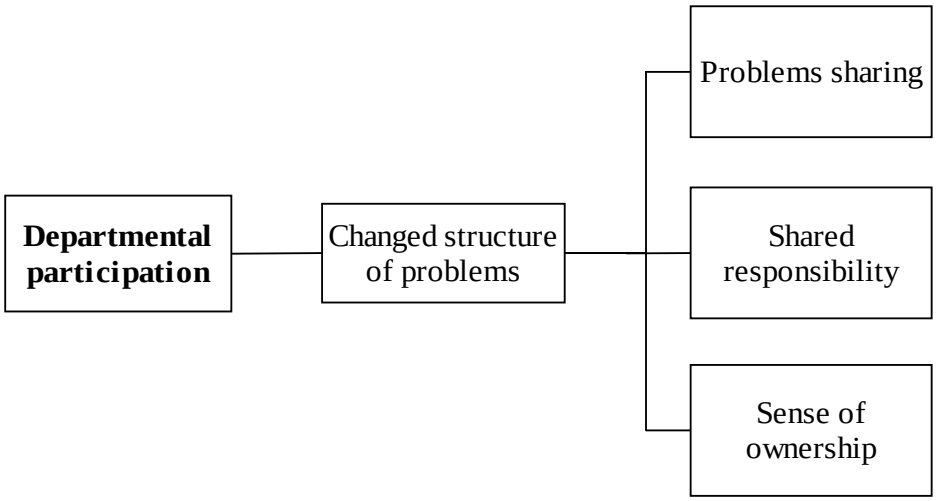
During the problem identification phase, the researcher introduced the factor model for the team as a problem identification technique. The entire team was asked to list and brainstorm their departmental problems. The brainstorming technique creates a new approach to information gathering. Team members have a large amount of input and more completeness of information on the issues of Internet banking development. As a result, there is an opportunity for team members to share their department problems with other team members. This problem sharing converts departmental problems into team problems. There is a change of the problem structure from individual or departmental level to team or team level. One team member from marketing who previously performed the action plans formulation accepted that the way team members participate and share their departmental problems creates the shared problems or team problems:

> *I agree with the brainstorming session, and inviting many people to come to work as a team and share problems. When people come to participate and discuss, the occurred problems become everyone's problem.*
>
> *(IBDT 01/Q2.1)*

Departmental participation creates significant change in the way team members address their problems. Problem-sharing among team members establishes team problems.

Figure 5.3:

Summary model of changes in problem structure



5.1.4: Departmental participation creates team orientation

Team orientation refers to the situation where team members come to work together as a team and share some common purpose, work, ideas, objectives, responsibilities, and ownership for the Internet banking systems modification and maintenance process. They work as a team and support each other to complete and achieve the team's objectives. There are five propositions from the data which support this theme. They are:

- 5.1.4.1: Team orientation creates shared problems, responsibility, and ownership;
- 5.1.4.2: Team orientation generates shared ideas, objectives, and direction;
- 5.1.4.3: Team orientation creates sense of ownership and project ownership;
- 5.1.4.4: Team orientation creates stimulation and cross-checking; and
- 5.1.4.5: Team orientation creates shared benefits of success.

5.1.4.1: Team orientation creates shared problems, responsibility, and ownership

There is a significant benefit from problem-sharing. Team members know the exact scope of problems and unexpected problems, in some cases; one problem required more than one department to solve it. One team member explained how they can benefit from sharing problems. She says

> *Everyone brings problems to share with each other, and then the problems will be identified and classified for the problem's owners. It is good and better than before because if we do not share problems we will not know the scope of problems, possible or unexpected problems. We will not know the alternative for problem-solving. My view may be easy to solve, but in reality it is not that easy, for example some problems, I felt that it is a difficult one but when we share with IT, IT has know-how; the problems can be fixed easily.*
>
> *(IBDT 01/Q4.9)*

One of the team members realized that the problems will not belong to any particular department anymore; the problems are shared among team members and become team problems rather than individual or departmental problems. She supports the idea saying

> *When we come to work together we bring the departmental problem and share it with other team members. The other team members have a chance to learn and know the other team members' problems. All problems have been shared among team members.*
>
> *(IBDT 02/Q4.9)*

Apart from sharing the problem, team members also have an opportunity to learn from each other regarding the scope of other departmental problems. This point of view also is supported by the team leader. He posits that he perceives the change in the ownership of problems. He points out that the structure of the problem has been changed from a departmental problem to a team problem: *"Therefore, they will share the same problem which is a team problem, not an individual or departmental problem" (IBDT 04/Q4.9).*

Departmental participation allows team members to share their departmental problems and this scenario creates a shift of the problem structure from departmental problems to team problems.

Each department has its own number of departmental problems and attempts to solve its problems from within the department. In reality, the departmental problems are not able to be solved internally because some departmental problems are possibly related to other departments. Some problems need several departments to cooperate and to find a solution. Therefore, when team members come to work and participate, they have an opportunity to share departmental problems and learn of each other's problems. Shared problems create an opportunity to share responsibility amongst team members. Therefore, when shared problems and responsibilities have been created, team members treat problems as their own problems. Team members take responsibility and add their inputs into the team.

Some of the additional benefits for sharing responsibility are the ability of team members to understand the limitations of problem-solving, foresee potential problems from contradictory action plans, and solve problems by using their expertise and experience. The departmental problems did not belong to any particular department, problems belonged to team. Team members solve problems together as a team.

> *When we can talk and work together, the problems belong to everyone, and everyone shares the problem, and takes shared responsibility to solve the problem. We will know the limitation of the problem-solving and realize that the occurred problem does not belong to any particular members, but it is the problem that needs to be solved together.*
>
> *(IBDT 01/Q2.1)*

The other major benefit of sharing the responsibility is a motivated working environment. High motivation exists after team members make their commitment to the problems. Team members attempt to find solutions to the team problems. A team member explains how the highly motivated team is created. She explains

> *When team member works as a team and has responsibility to perform his or her work, the team will have a good performance. It is because when everyone commits to the team, they will try their best for the team*

> *performance. Everyone adds their input to the team. Everyone pays attention and is responsible for their assigned work as we work toward the same target or goals. Everyone works together and shares the same objective and wishes to achieve the same objectives. Therefore, the team will create an effective team performance. There is a high motivated environment to work and achieve a target together.*
>
> *(IBDT 02/Q4.4)*

However, during the action research process there was an issue of the level of commitment among team members. One team member had a strong feeling regarding the team commitment. Team members need to have true commitment, otherwise there is an opportunity for team members to ignore the shared responsibility. If team members have a high level of commitment, each member performs his or her assigned task in line with the same targets. There is no need to ask for favors to perform assigned tasks

> *It will be effective if everyone thinks they share the same problems; the problems do not belong to any particular team member . . . if each member realizes that it is shared work and does not belong to any particular member, we need to work together and help each other in order to achieve the target. We should not beg for progressed work. Therefore, if everyone in the team has team commitment, the team will work more efficiently because we do don't beg the other team members to work for their parts.*
>
> *(IBDT 01/Q4.4)*

True commitment also plays a significant role in Internet banking problem-solving. During the action research process, there was a team member who felt that she needed to ask for extra favors from other team members. This situation does not support and promote teamwork and team commitment. Therefore, simply sharing problems to create a motivated environment seems to be insufficient. The same team member has further pointed out that shared responsibility means that team members need to be allocated responsibility fairly or evenly. Team members need to commit themselves, support each other and complete their assigned tasks. If team members

can achieve shared problems and equal responsibilities, this kind of performance will definitely promote effective team performance.

> *If everyone participates in the team and shares the responsibility fairly, it is not like after the brainstorming session which pushes all the responsibilities to other members, this will be the other type of performance. However, after the brainstorming, everyone helps each other and takes part and is in charge of the problem which is their responsibility in relation to the problem. Everyone will be happy to work.*
>
> *(IBDT 01/Q2.2)*

Team members take shared responsibility for their part, based on their expertise. This shared responsibility stimulates and encourages team members to put their effort into the team in order to achieve the team objective. "*Each member will be in charge based on their specialist skills, so that each member wants to participate more and wishes to solve the problem together as a team*" (IBDT 01/Q2.1) Team members take part in problem-solving based on their skills.

In contrast, if there is pushing or denying of responsibility after the brainstorming, no team members will be keen to take responsibility for shared problems. This situation of noncooperation creates a negative working environment as a consequence of unmotivated team members. The worst case scenario is team members having a depressed attitude toward teamwork.

Shared responsibility promotes a highly motivated working environment and effective team performance, but team members need to have true commitment and share responsibility equally.

There is change in ownership of problems from departments to Internet banking team's problems. Another team member agrees that when all related departments come to work and participate as a team, the ownership or responsibility changes from individual problems or departmental problems to team problems or shared problems. In terms of objectives, previously, each department worked separately; therefore, each department may have had different objectives. The different objectives may not support other departments' objectives and/or the objectives are not going in the same

direction. The objective of one department may contradict that of other departments. In this case, it is hard to achieve effective performance. When team members come to work together they **share departmental objectives** with the other team members. In this case, team members have an opportunity to create shared objectives and all objectives are shared and merged into a team objective. There is a compromise objective. One team member identified that the compromise objective reduces the amount of departmental conflict and assists all departments to move in the same direction. She explains

> *We can compromise or find the solution to support each other and work in the same direction without conflicting with each other. If we still work individually, we have no chance to know the problem. Therefore, we achieve the same objective or team objective.*
>
> *(IBDT 02/Q4.8)*

There is an addition supporting argument from the IT support manager. She proposes that working in the same direction does promote less conflict between departments. "*There is an effect toward team performance because we see and work in the same direction; we will have less conflict between team members*" (IBDT 03/Q4.8). The decreased conflict between departments creates effective team performance.

Once team members share information and understand each other, there is an opportunity for the Internet banking maintenance and modification team to create and develop sophisticated Internet banking services. The customer's demands will be responded to effectively and all problems will be solved accurately. Team members work well together as team. This type of performance creates happiness among team members, and team members enjoy working with each other. The enjoyment indirectly promotes effective team performance. The team member who looks after web design explains

> *When we share knowledge and information, we will know about how to design good Internet banking services. We can answer the customers' questions and customers will be happy to use our system. The marketing and customer service are happy when customers are happy. When all parties who work together are happy to work together, the overall team performance also increases and works more effectively.* *(IBDT 01/Q3.4)*

Smooth and effective Internet banking development processes are the outcome of good communications and relationships among team members. Team members create a sense of belonging within the Internet banking development team; a sense of belonging minimizes conflict between departments. Team members work well together and they create good friendship and workmanship among team members. This situation definitely promotes an effective Internet banking performance.

5.1.4.2: Team orientation generates shared ideas, objectives, and direction

Department participation allows team members to share their objectives. The shared objectives combine team members' ideas during the discussions and meetings. It is always good to have team objectives that are accepted by all team members. It is impossible to achieve consensus on a team objective without team participation.

> *Everyone can share their personal ideas with the whole team and the whole team can discuss and come up with the shared objective. Everyone has an opportunity to present their ideas and opinions that it should be this way or it is not quite correct that way. Everyone accepts the team objectives. So everyone's objectives will be included and combined the team objectives.*
>
> *(IBDT 02/Q4.7)*

The main objective for team members is to improve Internet banking services. Since team members come to join, they have automatically shared common objectives.

> *We come to join the team we already have shared the objective of improving Internet banking services. It is not about joining and then sharing the objective. We have the same objective beforehand. It comes before becoming a team.*
>
> *(IBDT 03/Q4.7)*

There are many benefits from sharing the same objective. The first benefit is the responsibility sharing based on team members' expertise. Team members take part in actions by using their experience and expertise for problem-solving. Therefore, team

members solve the shared problem and work to achieve the main team objective. The team leader explains

> *The initial objective is to improve the quality of Internet banking, in order to improve Internet banking; we need to solve all the problems. Therefore, each team member will take responsibility in their area and try to achieve the action plans. Everyone works toward the same target because they have the same goals.*
>
> *(IBDT 04/Q4.7)*

Team members solve their part of the whole Internet banking problems based on their expertise. Therefore, when team members finish their responsibilities, all the Internet banking problems will gradually be solved and the Internet banking service level will improve.

The second benefit is the amount of input from team members who are added into team. When team members have the same objectives, they are happy to provide their input in order to achieve the team objective. One of the team members reflected

> *Based on my experience, I feel that everyone who comes to join the team adds their input to the team and we have a target to achieve the same objectives which is to develop better Internet banking services.*
>
> *(IBDT 03/Q4.1)*

The additional benefit from the shared objective was the team vision. Everyone wished for and visualized the same successful outcomes. Therefore, everyone worked at the same pace and synchronized with each other. The synchronization assisted team members to work in the same direction. "*We have an opportunity to share ideas and opinions. This in turn creates the same vision among team members. We will work toward the same goal and work in the* ***same direction***" (IBDT 02/Q4.6). Therefore, when team members worked synchronously, the working environment seemed to be a supportive environment and have a smooth operation. Team members achieved this supportive environment and smooth operation because "*We* ***share objectives*** *and move in the same direction. We share the same vision and picture; we work well together toward the same goals"* (IBDT 03/Q2.2). There was also an opportunity to exchange ideas and opinions among team members which promoted effective team performance. *"In addition, we also have a chance to exchange ideas*

and opinions. We can work well together and produce the effective team performance" (IBDT 02/Q4.5). Team members have the same target and team members put in their high level of effort to achieve the team target. There was cooperation between team members. This type of performance created effective team performance, and, as a result, team members addressed the problem effectively.

The last benefit of shared objectives was effective team performance. "*We can create effective team performance because we* ***understand and have the same objectives****"* (IBDT 02/Q4.8). The effective team performance was a consequence of the supportive working environment and sharing objectives. The shared objectives, visions and directions assisted and guided team members working toward effective Internet banking problem-solving. Team members worked and supported each other to create the whole Internet banking development system.

In summary, the shared knowledge, information and problems had created some significant changes for the Internet banking development process. The first and foremost change was the structure of Internet banking problems. There was a shift from departmental to team problems which led to shared responsibility among team members. Team members worked synchronously toward the same targets. The success of problem-solving was credited to team members rather than departments. There was a highly motivated working environment within the Internet banking development team.

This kind of performance definitely created a high level of commitment so that everyone had to perform, not for their own benefit, but for the team's benefit, which at the end the project, did benefit all the team members.

The majority agreed that team orientation provided an opportunity for team members to support each other and the supportive environment promoted effective performance. One team member believed that it was always good to have someone to help and support and she put it this way "*It will have more effective performance for*

sure because ***more people are better than one****. If you work separately, there is no one to help and discuss when we confront any obstacle"* (IBDT 01/Q4.4).

It was always useful to have multiple people to discuss and generate broad views and ideas for problem–solving. Team members helped each other to generate several alternatives and solutions. In special cases, a new dimension of views and perspectives was derived from the outsiders. Some problems were outside the scope of the team. The outsiders generated some fresh ideas that definitely have been useful ideas for problem-solving. During the action research process, one team member realized that the team orientation provided team members with useful comments and solutions derived from the other departments. She stated, "*When we attempt to solve our own problem,* ***an outsider's point of view*** *may be useful to be able to think about* ***the other alternatives or solutions****.* ***Two heads solve a problem and find*** *a correct answer* ***better than one*** *can find"* (IBDT 03/Q4.10). The outsider's views made a significant impact on problem-solving and brought a new dimension of solutions and perspectives for problem-solving and idea generation.

Working in the same direction was one of the vital elements for team performance. All team members worked toward the same goals and goals combined all departmental objectives. Team members felt that they were project owners. Therefore, team members paid more attention and supported each other to achieve the team objectives. The departmental objectives were a subset of the team objective, and team members worked as part of the larger total project. All team members needed to complete their part in order to achieve the whole project. Therefore, to enjoy the benefit or achieve the project all team members worked together and supported each other. They worked in the same direction or synchronously. There was no boundary within the Internet banking development team. One team member agreed with this, and admitted

> *If everyone has a sense of ownership of the project, all the intentions will combine into the same spot. Everyone will pay high attention to the project and it should have a good result. Also everyone will help each other to achieve the project. Everyone will have the same direction and interest. (IBDT 02/Q4.2)*

The team leader believed that when team members worked in the same direction, the operation of the Internet banking development process went smoothly and there was an effective and efficient team performance. He admitted

> *Teams perform well when they work in the same direction and support each other. Everyone has to perform and achieve their action plans or assigned work. When everyone achieves their work, the operation runs effectively and team members will achieve the team objective as a team.*
>
> *(IBDT 04/Q4.8)*

5.1.4.3: Team orientation creates sense of ownership and project ownership

Previously, members from all related departments worked and performed separately for the development of the Internet banking products and services. They worked and responded on the basis of boss commands. There was no opportunity for members to add their input and there was no encouragement for self-achievement for a Internet banking development team. One team member shares these thoughts.

> *Normally, they will be the people whose work relates to Internet banking. They have their responsibility for their work. I feel that they will still feel what are their works and responsibilities. They are responsible for their own scope of responsibility. It is true that they may have involvement but they still don't feel that they are the project owner because they respond for their own scope and not the whole project.*
>
> *(IBDT 01/Q4.1)*

The other team member supports the idea that "*when members have their idea or input into the teams, they will feel they own the project. In contrast, previously, all requests and commands came from the boss. I may feel that I just have to finish the work; I do not feel I am the project owner"* (IBDT 03/Q4.1). This statement shows that they perform tasks because of job responsibility.

The researcher feels that team members performed their tasks based on their responsibility; there is no self-achievement and motivation. Therefore, there was no

one adding extra effort to the Internet banking maintenance and modification process. This research shows that a new working environment created a sense of ownership among Internet banking development team members. Team members feel that they are project owners and have a sense of ownership.

The opportunity for team members to add their input into the Internet banking development process created team members' sense of ownership. Therefore, team members participate and have a desired to improve the Internet banking products and services. **"***Everyone participates and wishes to see their ideas implemented; it is exactly what I want the systems to be*" (IBDT 03/Q2.2). Team members have input and involvement in decision-making and share the same objectives; they have a sense of ownership and feel that they are project owners.

The additional strength of departmental participation is that when team members work as a team, they have a chance to combine their individual or departmental problems into team problems. One of the team members indicates that *"all problems will become team problems rather than individual problems. When we work as a team, we are the project owner; when we have problems, the problems belong to team problems not individual problems"* (IBDT 02/Q4.9). It is very interesting to see this change in problem structure and level of problem ownership. There is a shift from individual level to team level.

As a result, team members have their shared problems and objectives regarding the Internet banking development process. Every team member adds his or her input into the Internet banking development process.

> *Everyone has action plans and everyone can implement their action plans. We can put all action plans together and classify all action plans and prioritize action plans based on the emergency basis. Then we put the approved action plans in action. So everyone feels that they are project owners, they present ideas and the ideas are implemented.*
>
> *(IBDT 04/Q4.1)*

Another team member also supports the idea that "*everyone accepts the team objectives. So everyone's objectives will be included and combined as the team objectives. We can also help each other to refine the team objectives. Everyone feels happy that they are the owner of team objectives"* (IBDT 02/Q4.7) and "*Everyone has shared problems and objectives and everyone becomes a project owner and wants to achieve team targets*" (IBDT 02/Q5.1). The project ownership is created when team members have personal involvement in the development process. Team members feel that they are project owners. As one team member mentions, *"there is a sense of ownership because we work together, present ideas, and we are part of the project. I feel like I have to take responsibility for the project, I am a project owner, I want to see a good outcome"* (IBDT 02/Q4.1). The other supporting evidence for the relationship between a sense of ownership and project ownership is shown by a comment of one team member. She argues that "*when everyone has a sense of ownership they feel that they are the project owner, so they try to do their best to perform well and achieve the team objectives"* (IBDT 03/Q4.2). A sense of ownership made a significant contribution toward the Internet banking development process. Team members took responsibility seriously.

Team members felt they are real project owners. This sense of ownership promotes a high level of commitment. Members were asked if, when they worked as a team, they took more responsibility for their work. Interestingly, one of the team members answered

> *It may not have more responsibility than individual but we need to make sure that our performance will not affect other team members. If we do individually, the effect is just I, but if we do as a team the result may affect others. So we need to pay more attention to work.*
>
> *(IBDT 02/Q4.1)*

This statement made the researcher realize the impact of uncompleted work and the level of commitment that team members had to put into their work responsibility. It is clear that that when working as a team, members have not only a sense of ownership but also a high level of commitment to achieve their work and responsibilities. The level of commitment is reflected by the team leader who comments

> *When people have a sense of ownership they will have commitment to the project. I wish to develop better products. Therefore, what ever I am a project owner in action plans I will do it and push till success.*
>
> *(IBDT 04/Q4.3)*

The logical explanation behind this phenomenon is there is an alteration of impact of delayed work or uncompleted work. The consequences of delayed work affect other team members; as one team member explains

> *If the team members feel that it is a responsibility, and it needs to be achieved, this may force them to perform and perform more effectively. It means when team members share the responsibility, this in turn will pressure them to perform. Also the work can continue, if one task is delayed, it will have an effect on others. This may force team members to perform. If one team member fails, the other team member will follow the trend as a chain reaction. So that team member needs to achieve his or her task in order that the other part will be continued.*
>
> *(IBDT 01/Q4.2)*

Everyone within a team has to commit themselves and is expected to deliver a good performance. Therefore, the other team members can perform their successive tasks. This is somehow generating a significant impact of commitment to team performance. Another team member gives her opinion regarding team commitment

> *When we work as a team, each member will automatically have team commitment because individual members need to make sure that the individual work has been achieved in order that the other members can continue their work. This is a smooth flow or operation. This will make team members have more commitment. They need to take responsibility for their part.*
>
> *(IBDT 02/Q4.3)*

There are two additional explanations for the creation of team commitment. One team member explains, "*it may create commitment because first of all we are the project owner; we are keen to achieve and finish the project. Team members present the idea and the idea has been adopted, it will create commitment automatically"* (IBDT 03/Q4.3). The other explanation was "*We are the project owner, we are committed to finish the task; attempt to finish and performance will improve. The operation is very*

active; and when members perform seriously, the work flows continuously" (IBDT 03/Q4.4).

There is a significant outcome from departmental participation; there is a good working environment and a good performance. This statement was supported by one of the team member's reflections. He states, "*the team will have good performance because the team has a sense of ownership and commitment, then performance will come because they are the project owner and they will take good action"* (IBDT 04/Q4.4).

Based on the actual outcome after the action research process, the researcher realized that there is a good performance and supportive and energetic atmosphere for Internet banking development process. Members have a high level of sense of ownership and commitment to the team. Team members believe that they are a project owner. However, the sense of ownership and commitment are not the only two outcomes of departmental participation. Team members also have an opportunity to encourage, stimulate and support each other to perform good work. A sense of ownership has the significant impact of effective team performance.

5.1.4.4: Team orientation creates stimulation and cross checking

Team orientation is an important factor for Internet banking maintenance and modification team because this the working context in which team members stimulated each other to progress work or ignore problems, and, at the same time, also support each other to achieve the team objectives.

During the action research process, the researcher sees that there is great support and stimulation from team members which helps them to effectively perform and develop the Internet banking systems. Team orientation generates an opportunity for team members to stimulate and support each other.

During team meetings, team members have an excellent opportunity to stimulate the other team members. This stimulation creates a significant impact on Internet banking

development. This is because some of the problems are long term and complicated which have been ignored or overlooked during the previous Internet banking development process. Some problems involved many departments and there is no clear boundary regarding who will take responsibility and the amount of responsibility to be taken. The main advantage of team orientation is that all departmental problems are shared and become team problems rather than departmental problems. Team members have chance to readdress the forgotten problems during team meetings and stimulate all related departments to share the responsibility in order to solve long term and complicated problems. One team member illustrates how team orientation stimulated other team members. She states that:

> *I my case, there are many never-ending problems, which have been discussed for long time. If the team gives me a chance to talk I will always talk and emphasize the problem again. At least, I can stimulate others to do something or create some feedback towards problem. Even though it will not directly solve the problem, but it may solve close to or indirect to problem in terms of the chronic problems or never-ending problems.*
>
> *(IBDT 01/Q2.4)*

Therefore, the long term or chronic problems are taken care of by the Internet banking development team members. The chronic problems might not disappear but at least they are looked after and team members attempt to solve them. Working as a team also creates a supportive working environment or context. This working context allows team members to support each other to achieve the team objectives. After achieving team objectives, everyone within the team receives the benefit as a whole not individual benefit. Therefore, the driving force of motivation changes from individual to team benefits. The whole project improves not individual or departmental achievement. Team members need to help and support each other to achieve team objectives. One team member explains:

> *If we set up the team and have a formal team structure because when we work as a term we have a chance to support each other. What we do will benefit other team members and what the others team members do, in turn will benefit myself. Everyone wishes to do and perform more. It is a kind of building a commitment to each other.* *(IBDT 01/Q4.3)*

Team orientation allows team members to stimulate each other for work in progress and for forgotten problems. The forgotten work will be readdressed and identified with clear boundaries and responsibility will be shared among team members. Team orientation also creates a supportive working environment in terms of number of people, fresh and new ideas from outsiders, and direction of work.

Team orientation also provides an opportunity for team members to evaluate and cross check each other for mistakes and hidden problems.
Team members perform evaluation and cross check of progressing and finished work for other team members to ensure that there is no mistake or side effect from implemented action plans.

The researcher also sees that during action research project, members work as a team rather than as departments. Team members work well together and they create an opportunity to ensure that all tasks are done properly and met the specific timeline.

One team member stated that when team members work together as the Internet banking development team "*We help each other to find other alternatives or solutions to address the problems. So we have an ability to realize problems and solve problems*" (IBDT 03/Q3.4). There is the possibility to identify problems and create other alternatives for problem-solving.

During team meetings, the solutions and ideas were transformed into action plans. All ideas, solutions, and action plans were seen and evaluated by team members who are experts in different parts of Internet banking maintenance and modification. Therefore, the formulated action plans are correct. Team members believe that "*Ideas can be evaluated by many team members; the action plan will be as correct and suitable for problem-solving"* (IBDT 02/Q2.4). The evaluation process assists team members to ensure compatibility between problems and action plans.

In addition, there is a process of redefining and cross checking of the formulated action plan. One team member claims that "*there is the process of redefining and*

cross checking for correctness and when people present their ideas to others, team members will screen and refine ideas" (IBDT 02/Q2.4). There are cross checking and screening processes for the correctness of action plans formulation.

All formulated action plans are checked and evaluated by team members before implementation "*team members have a chance to cross check and examine the solutions before implementing and make sure that the solutions are the appropriate solutions for the problems*" (IBDT 02/Q4.10). As a result, team members can eliminate the number of errors "*there will be cross checking between team members and the work will have less mistakes or errors*" (IBDT 02/Q3.2). The number of errors and side effects are reduced.

In the previous Internet banking development process, there were two disadvantages, the first disadvantage is there is no support from others expert in the field and the other is that there is no cross checking of the formulated action plans before their implementation. These disadvantages occurred during the previous Internet banking development process and team member comments that: *"If you work separately, when we confront any obstacle, there is no one to help and discuss and there is no one to check and recheck the tasks*" (IBDT 01/Q4.4).

There is a significant change during the action research that is derived in terms of supporting and evaluating of team members for action plan formulation. Team members combine their departmental objectives and create milestones for formulated action plans. The formulated action plans are evaluated by the whole team of the Internet banking development team. Team members not only support each other but they also keep their eyes on each other's progress. This working environment creates stimulation among team members. Team members share that:

> *We will have milestones to check or check points, we will check each other and make sure every team member does a good job and right on target and schedule. We can watch out for each other and help each other to perform a good job.*
>
> *(IBDT 01/Q4.4)*

There are additional benefits from team orientation; team members can foresee the potential problems from formulated action plans. One team member proudly presented that "*Everyone in team helps each other to solve problems and provide suggestions based on their experience and knowledge, therefore, we foresee potential problems and the possibility to implement action plans"* (IBDT 02/Q3.4). A team member shares her experience. She posits that:

> *If there is some one who can come to check and recheck there is no mistake. The work will flow smoothly and I will feel confident to work. Instead of my doing all the work and then passing it to the other department to check, if we can do all tasks together, we can correct the mistake right away. If we work separately, when the mistake occurred, the whole module needs to be redone and reproduced which is a waste to time and effort…. If I make any mistakes, the whole lot will be sent back to me to be redone again. While if we come to work together and work out everything parallel with each other and cross check with each other, this will save time and effort and work more efficiently.*
>
> *(IBDT 01/Q4.4)*

There are two main advantages from team evaluations and cross checking. These are a reduction in errors and in time. In case of error reduction, the number of errors reduced because all action plans had been evaluated and approved by the team members. One team member argued that "*We will perform better than normal because it has been* ***screened and evaluated from many experts*** *in the Internet banking scope"* (IBDT 02/Q3.2). In terms of time, it was clearly reduced because all decision-making and action plans formulation and implementation had been accomplished by team members and at the same time during team meetings. There was no passing the finished work around related departments. If there was an error or problems, the potential errors and problems had been identified and modified by team members during team meetings.

Team evaluation and cross checking promote the correctness of action plans and reduce the time for action plan formulation. Team members also ensure that there are no side effects from implemented action plans. There is a milestone to check for the

progress of work. Team orientation creates a sense of ownership and project owners among team members. Team members also stimulate and support each other in action plan formulation. The formulated action plans are evaluated and cross checked by other team members for the correctness in order to prevent the side effects of implemented action plans. Team orientation creates a supportive working environment for the Internet banking development team.

5.1.4.5: Team orientation creates shared benefits of success.

The sharing of success and achievement are the key driving forces for team participation. This is because "*if the team members feel that there is some benefit sharing for the same objective, they need to add more input and try to achieve"* (IBDT 01/Q4.8). This argument had been well supported during the action research Internet banking development process.

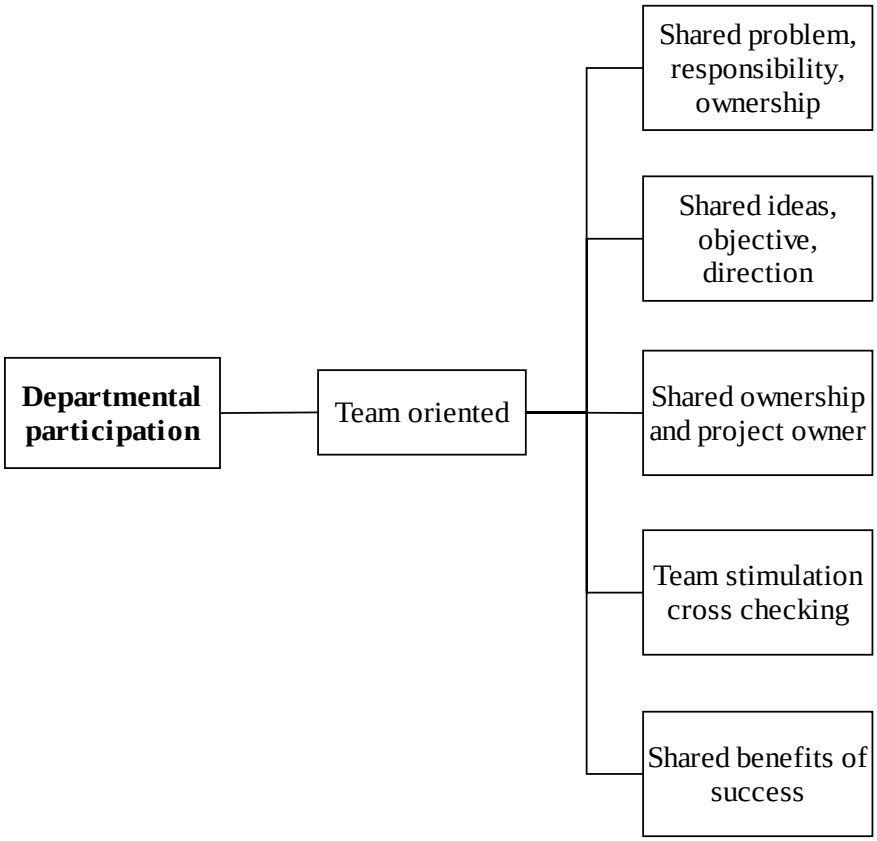
In the previous Internet banking development process, all related departments performed tasks based on benefits to their departments. The goal was to solve their departmental problems. It was department driven rather than whole system driven. During action research, the Internet banking development project team members worked together as team. The focus of achievement is changed from solving departmental problems to improving Internet banking products and services. This scenario exists during the Internet banking maintenance and modification process improvement project. Team leader reflects on this phenomenon:

> *Everyone wants to express their ideas and have action plans to implement. When the action plans have been implemented, the products are successful. Everyone succeeds. It is not success only for the product owner. Everyone shares the benefit of success.*
>
> *(IBDT 04/Q4.2)*

Shared benefits encourage team members to work as a team and stimulate team members to add more input into the Internet banking development team. Without team success, no one will succeed.

Figure 5.4:

Summary model of team orientation theme



5.2 Equal participation

Equal participation refers to the situation where team members have an opportunity to participate equally and openly during team meetings and discussions. There is no influence regarding organizational position during discussions and decision-making. Equal participation is another key element for the Internet banking maintenance and modification process improvement. After the team members were invited from all related departments, they need the authority and an equal opportunity to participate during the team meetings.

There was no formal team meeting for the previous Internet banking maintenance and modification process. The meeting for Internet banking development was part of the

formal meeting at the Top Management Team level. The meeting included president and all the vice presidents from all banking divisions. This meeting discussed the overview of Internet banking. The policies, strategies and decision-making of Internet banking were passed to all related departments via the vice president of the e-banking division who is the head of marketing department. There was no formal Internet banking development team. All related departments worked separately and followed instructions from the marketing department.

After the introduction of department participation as a new working practice, the researcher believed that Internet banking team members need to have full authority to participate equally and openly during team meetings and discussions. The equal participation is a supportive factor for the departmental participation. Therefore, Internet banking development teams exploit the full benefit of departmental participation.

Equal participation provides team members opportunity to discuss, express, participate, and present their opinion equally. When team members have an equal opportunity to participate they are not reluctant to participate, but will have high degree of willingness and openness to participate. The high level of willingness will contribute a large amount of effort into discussion and participation. The degree of openness of discussion generates good understandings among team members regarding problems of Internet banking, flow of Internet banking operational process, and other areas of Internet banking development process. This creates an opportunity for team members to discuss, participate, and learn from each others.

During the action research process, the findings indicate that the equal participation technique generated several significant contributions for the Internet banking maintenance and modification team and process. The single theme is:

- 5.2.1 Equal participation allows team members to share knowledge, expertise and information.

5.2.1 Equal participation allows team members to share knowledge, expertise and information

Shared knowledge, information and expertise refer to the working context where team members bring their individual knowledge, departmental information and technical expertise to share with the other team members during the group meetings and discussions. There are two proposition from the data and support this theme. The propositions are:

- 5.4.1.1: Shared knowledge, experience, expertise, and information generate a broad picture and extend knowledge of the Internet banking maintenance and modification; and
- 5.4.1.2: Shared knowledge promotes team learning and understanding regarding the Internet banking systems modification and maintenance process.

5.2.1.1: Shared knowledge, experience, expertise, and information

Knowledge and information are important for Internet banking maintenance and modification. Internet banking development team members need knowledge and information from various departments to develop and maintain the systems. Departmental participation provides a great opportunity for team members to participate and discuss Internet banking maintenance and modification. However, team members need to have equality of opportunity to discuss and participate. Equal participation will provide an excellent channel for team members to exchange their ideas, information, knowledge, experience, and expertise. During the group meetings and discussions, team members perceive the broad picture of the Internet banking development process; this broad picture helps team members perform more effectively. One team member believes that when *"Everyone shares information we will see the big picture and have the same understanding. This will help us work smoothly and have a good operation"* (IBDT 02/Q2.2). Team members work well when they have a good understanding about the whole Internet banking development context.

The information sharing provides additional views or useful information to team members. For example, in the area of Internet banking design, the web designer

basically used the IT point of view to design web pages. There is an opportunity for web designer to overlook some important non-IT aspects. This is because web designer used only the IT perspective and ignored non-IT aspects but Internet banking systems will be used by both IT and non-IT customers. One team member who works as web designer indicates that:

> *Some points of view I may overlook e.g. the view points of customers and systems, the customer service and programmer also provide me some comments, because in some cases I overlook how the customer will feel and the limitation of the systems.*
>
> *(IBDT 01/Q3.3)*

There are not many services that the web designer uses, and the system needs to provide a broad range of services to banks customers regardless of whether the services will be used regularly or rarely. Therefore, the web designer needs to have information from the other Internet banking services that she is unfamiliar with or has limited knowledge. The web designer needs to gather more information from other departments to be able to understand the other process and procedures of operations. She accepts that:

> *In my case, I use a few Internet banking services, when I design whole systems, I have to design the functions or features that I have never ever used. So I need information from other people or departments. This will help me to design better Internet banking services.*
>
> *(IBDT 01/Q3.4)*

In addition, as the web designer, she has limited knowledge regarding customer demands, customer feedback, and customer complaints, and customer problems regarding the Internet banking services. Therefore, the information regarding customer information is significant input for design of the Internet banking web page, features, and functions. The web designer needs to understand the bank's customers and receive all complaints for further improvement of Internet banking services. The web designer gives her real example regarding the need for customer information from other departments. She posits that:

> *I am in charge of designing Internet banking, I have no chance to understand bank customers and understand them. But Internet banking will serve all types of customers. So we need information from other*

> *departments who work with or relate to customers in order to understand the customers' demands and then we can develop the Internet banking services.*
>
> *(IBDT 01/Q3.4)*

One of the most important aspects for Internet banking development is the view points of other team members in terms of user friendliness and ease of use. Internet banking development process needs feedback and information from non-IT team members to evaluate how friendly the Internet banking services is. IT staff simply adopt an IT perspective to review the features and functions, therefore, all features and functions are user friendly and achieve a high level of usability. The additional input, information, feedback from non-IT members are useful for the development process, therefore, team members need to input from non-IT orientated departments.

> *To develop Internet banking services, we need other view points which do not come from IT people or web development people. The people who are not IT persons and web designers can guide the direction to suit customer demand and preference, which one is user friendly, because in the eyes of IT and web designer all features and functions are user friendly.*
>
> *(IBDT 01/Q3.2)*

In developing Internet banking services, the web designer has to work closely with the IT support department and these two departments need to share information. The web designer designs the web page, features, and functions of Internet banking. IT support performs back office work for the web designer. There is a requirement for these two departments to know and understand each other very well in order to support and co-operate with each other. The web designer shares her personal experience regarding the cooperation between herself and IT support manager. She shares her example:

> *Can the programmer support the new design or function? In some case, I want just a simple thing, but the systems can go beyond that, systems can do far better than the designer's demand. So we need the concerns or points of view from programmers as well. Also the program can provide the feed back for the possibilities of the function. I dream about new service, at the end programmer comments that it is impossible in reality. It is a waste of time and effort.*
>
> *(IBDT 01/Q3.2)*

Internet banking development team needs both IT and non-IT knowledge and information in order to develop sophisticate Internet banking services. The shared knowledge creates the extended knowledge and scope of Internet banking development. The previous Internet banking development process team members know only their own areas of expertise and there is no chance to know or understand the other related departments working context. One team member shares her experience and she supports this argument:

> *In reality, when we work we know only our own scope and we do not know about any other work. What we know other may not know and what others know. I may not know.*
>
> *(IBDT 02/Q2.1)*

Basically, individual team members focus on their own area and each member has unique expertise in this area. The departmental participation allows team members to speak and discuss specific concerns. Therefore, there is a good opportunity for team members to share their knowledge and expertise to other team members.

> *The team leader explained how knowledge had been shared among team members. He said that "Team members they look in-depth detail of their experts, so when we allow them to speak they will bring their knowledge and expertise to share with team members."*
>
> *(IBDT 04/Q2.2)*

There is not only shared knowledge, but information is also shared, team members also have an opportunity to share their valuable information with each other. Team members believe that both knowledge and information are shared among team members during the group discussion and participation. One member comments:

> *Team members will share knowledge and experience and specialty. We will share all information and knowledge because everyone has various experiences and expertise. So information will be shared between team members.*
>
> *(IBDT 04/Q3.3)*

The majority of team members believe that there is knowledge sharing among team members. The web designer agrees that "*there is knowledge sharing between team members*" (IBDT 01/Q3.3). The customer service manager agrees with knowledge sharing she states that *there is shared knowledge among team members because we*

come to participate and share experience with other team members" (IBDT 02/Q3.3). There is an opportunity to understand other areas of Internet banking systems modification and maintenance process because team members also share their working experience. One team member comments that:

> *I may not know about the scope of IT or customer service, so when they have a chance to come and work together they share their experience with other team members. We will know and understand the other members. I also have a chance to share my experience with others.*
>
> *(IBDT 02/Q3.3)*

The shared knowledge and experience provide great benefits to the team in terms of help and support. Team members support and help each other to address problems by using their expertise. One example that shows how knowledge and information sharing can contribute to Internet banking maintenance and modification process, is finding a solution to the problem of system overloaded. The web designer explains that the "*team can help each other to find the solution to alleviate the systems overload problem by creating a new design in order to avoid systems overload problem"* (IBDT 01/Q4.5).

The most significant contribution of sharing knowledge and expertise is the capability to formulate effective action plans. This is because *"the team has know-how and experience. Team* ***combine all knowledge and experience****, team will have the ability to formulate effective action plans"* (IBDT 02/Q5.1). This helps team members to address problems more accurately and effectively than the previous Internet banking maintenance and modification process.

There is change regarding the scope of knowledge. In normal circumstances each team member knows and understands the overview or conceptual view of Internet banking development process. Team members have the practical view only in their own scope or responsibility. However, when members come to work as team, they bring their practical knowledge into the team and share it with the other team members. This new working context creates the opportunity for the rest of team to learn and understand other practical views of the whole Internet banking system.

> *This shared knowledge and information will help the other team members learn more about other experience and knowledge. In general, everyone will know the overview of Internet banking systems, in conceptual view not in practical view.*
>
> *(IBDT 01/Q4.5)*

Prior to the action research, team members understand only their part of the Internet banking system. Team members had no opportunity to see and understand the other functions or the whole picture of Internet banking development process. Departmental and equal participation created a new working environment and this new working environment assists team members to share their knowledge, skill, expertise, and information with other team members and allows everyone in the team a complete view of the Internet banking development process.

> *When we come to work together, we have a high opportunity to share personal knowledge and experience with other team members in order to create team understanding about the whole process of Internet banking development. The team will be able to see the whole picture of Internet banking development process.*
>
> *(IBDT 02/Q4.5)*

5.2.1.2: Shared knowledge promotes team learning and understanding

Team learning and understanding refers to the situation where team members learn from each other and this learning experience assists them to gain comprehensive understanding of the Internet banking maintenance and modification process. Team learning occurs when all related departments are invited to participate and share their knowledge, experience, expertise, and information. Individual team members represent their department and are experts in their own area. When team members come to work together, they have an opportunity to share their experience, expertise, knowledge, information, and ideas and learn from the other team members. This working context promotes and generates a team learning environment among team members.

Team learning promotes team understanding because once team members learn the full scope of the Internet banking development process; this learning assists them to

understand the entire Internet banking maintenance and modification. Team members agree that good understanding creates a smooth and effective operation. This is because team members learn about each other and use their expertise to address the problems more effectively and accurately. Team members address problems more accurate than single department. Therefore, they believe that when the problems are addressed accurately and effectively the overall performance of operational systems and Internet banking development process is improved and enhanced.

> *When we learn more about other member's demands or problems, we have more chance to help them to address problems accurately and directly. The problems been solved, the operation run smoothly and effectively. The overall team performance will be enhanced because we learn more about the other part of development process and understand other departments.*
>
> *(IBDT 03/Q4.6)*

One team member explains how team members learn from each others during action research in the Internet banking maintenance and modification process. She realizes that in the previous Internet banking systems modification and maintenance process, knowledge and information have not been generated and shared among team members because the previous process did not allow all related departments to communicate, participate, and cooperate directly. In contrast with the current Internet banking development process, where team members are encouraged to participate and discussed openly and equally. This new working context provides opportunities for team members to learn from other members. She comments that:

> *Team members will learn from other members because each member will know only their scope and little on other scope. So when we come to work together members share their ideas, experience and knowledge during team meetings. Everyone will learn from each other.*
>
> *(IBDT 03/Q4.5)*

The other team members pointed out that the scope of Internet banking development knowledge is expanded and increased. Internet banking development team has an ability to see a broad and completed view of Internet banking maintenance and modification and its problems because team members add their ideas and share their ideas with the other team members. A member states that:

> *Everyone can add ideas and solutions to each other. Knowledge can be expanded and the scope of knowledge will increase, team members can see a wider picture of Internet banking development process.*
>
> *(IBDT 02/Q1.1)*

In terms of problems, there is a large number of problems in Internet banking maintenance and modification. Each department has no idea of other departmental problems. One team member realizes the benefit of working together and she mentions that "*when we come to work together, we bring the departmental problem and share with other team members, therefore, the other team members have a chance to learn and know the other team members' problems*" (IBDT 02/Q4.9). Team members learn the other parts of Internet banking maintenance and modification and team learning is created. This environment helps team members to learn the additional knowledge and problems outside their expertise.

The completed view of Internet banking development process exists when team learning exists. Team learning allows team members to gain insight knowledge and understanding of the whole Internet banking development process. Therefore, team learning is crucial for Internet banking development process because team members acquire completed knowledge, information, and skills in order to develop and enhance Internet banking systems. There is knowledge transference and sharing among team members and the scope of knowledge is expanded. The expansion of knowledge assists team members to perceive the broad and completed scope of Internet banking development. Three out of four team members have the same opinion regarding the broad scope of Internet banking development. Team members state that "*when we share information and knowledge, then we gain better understanding of the whole process*" (IBDT 03/Q3.4) and "*when people come from different departments and share their knowledge and information, this will help us understand and perceive the broad overview of Internet banking*" (IBDT 01/Q3.3). The broad knowledge of Internet banking development creates good understanding of the Internet banking development process.

There is a possibility to understand the Internet banking development problems from other departments. Team members shared knowledge, information, expertise, and departmental problems. Team member agrees that "*everyone will have a clear picture about the whole Internet operational banking development process and we also have a chance to see the problems and process of other members*" (IBDT 02/Q3.3). Therefore, team members understand process, problems, and understand the completed picture of Internet banking development. However, there is an additional key contribution from team understanding. Team members understand each other's work and departmental limitations. Without knowing each other's limitations, there is no chance for team members to create realistic action plans.

Realization of departmental limitations assists team members to understand the capabilities and abilities of related departments to formulate realistic features and functions. One team member gives an example that "*when we know each other's work process and limitation, therefore, team members know what functions and features can be developed"* (IBDT 02/Q4.5). One team member who looks after the Internet banking design give her own experience about how departmental and equal participation assisted her understanding about the possibility of a new Internet banking design. She explains that "*we will know the reality, can the design be implemented or not? Therefore, we need to be involved in every step of the development process"* (IBDT 01/Q3.2).

Equal participation allows team members to discuss and explain their ideas and opinions which create good understanding among team members. Prior to the action research process, each department worked individually, staff from each department knew only their own area. One team member notes that "*we will know only a narrow scope of the whole Internet banking development process, so when we invite members from other related departments. We will know and understand a broader scope of Internet banking development"* (IBDT 03/Q3.1). The same team member comments further that:

> *I think it should be like this, but with comments and other points of view, we may see a different point of view and we will also have a chance to discuss and defend our*

> *own ideas as well. I will have a chance to explain what is going on within my own working responsibility. This helps other people to understand other people's working context and understand the flow of the operation.*
>
> *(IBDT 03/Q2.4)*

The majority of team members believe that team learning happened during the Internet banking action research process. Without departmental and equal participation, there is no team learning. Each department is an expert in their field. When they come to join the development team, they bring their expertise and knowledge and the team acquires a broad range of skills and expertise. One team member states that "*team will have various expertises within the team and we will have a chance to learn from the other team members, and we will have broad view of Internet banking maintenance and modification*" (IBDT 02/Q3.1). This is how team learning occurred within the team.

The benefit of team learning is that team members perform better than the previous Internet banking operational process. The team leader explains how team learning assists members to improve their performance. He explains that "*the team will perform better when team learning exists, because each team member will have a broad and complete knowledge of the Internet banking operation. Team members will understand each other's working process and limitations"* (IBDT 04/Q4.6). Team members also have an opportunity to understand the limitations of problem-solving. They can benefit from equal participation by gaining and extending personal knowledge. A group of experts for Internet banking maintenance and modification is also being able to give advice to the other team members' work. In some cases, this equal participation provides useful advice to other team members:

> *We have diversity of expertise among team members and the diversity of expertise is shared among team members. It makes team members learn and gain extended knowledge and be able to give advice or suggestions to address the problems.*
>
> *(IBDT 03/Q3.2)*

Another team member agrees that there is team learning and she explains that:

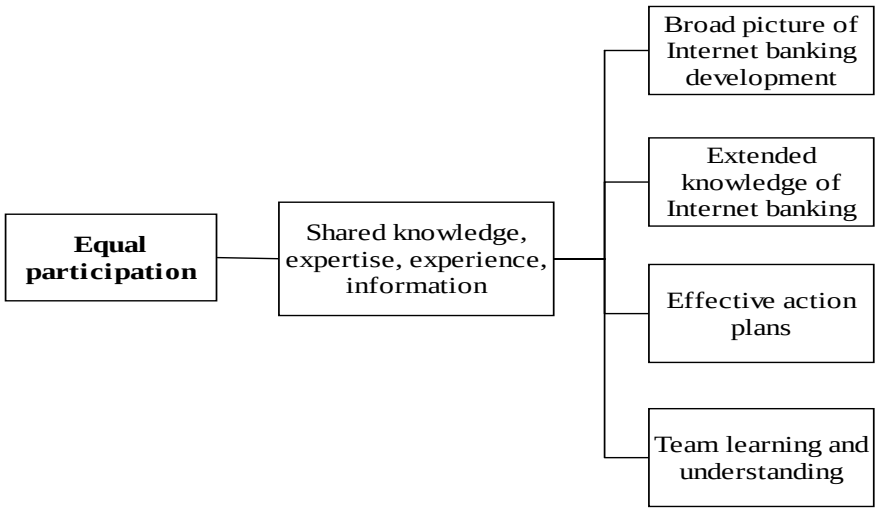
> *For sure, there is learning among team members. When people come from different departments, they discuss and*

> *express their ideas, other members will know what they want, what are they thinking? We will know a wider scope, outside our own expertise. When I see the report, it does not explain what is going on, what the problems are that you deal with. It does not state any key problems. I just know what the statistics are but it does not mention the problems.*
>
> *(IBDT 03/Q4.5)*

It is clear that, apart from team members gaining extensive knowledge outside their expertise, team members also understand what is going on within the problems and limitations of Internet banking development process. There is no good explanation from report and statistics summary. Team members will learn from the other team members during group discussion.

Equal participation and departmental participation need to be implemented during the Internet banking maintenance and modification because these two techniques allow team members to learn and understand the complete view of Internet banking maintenance and modification. In addition, the Internet banking maintenance and modification team will have a complete set of skills to perform the Internet banking maintenance and modification process effectively.

Figure 5.5:
Summary model of shared knowledge and expertise theme



5.3 Holistic scenario

Holistic scenario refers to the completed view of problems from Internet banking maintenance and modification process which has been gathered from team members who represented all related departments. The holistic scenario of Internet banking problems provides comprehensive views and different angles of problems from different departments. The different views, perspectives and problems of Internet banking adoption are accumulated via the problems identification technique which is called the factor model. The factor model is introduced to all team members as a group activity for brainstorming during problem identification process. The factor model seems to be a very effective model for problem identification of this process. This is because all problems are accumulated and categorized into structured and/or systematic categories. Also all problems are prioritized based on their urgency level. The prioritized problems allow urgent problems to be solved immediately and the lower priority will be solved in order. This structured problem emphasis is on the systems rather than departmental view.

The researcher finds that the holistic scenario of Internet banking assists team members to perceive the full picture of their bank's operations and its problems regarding Internet banking maintenance and modification.

During the action research process, the accumulated departmental problems are combined and organized into systematic categories. Then all of the problems are ranked and prioritized according to priority and urgency level. The systems approach allows team members to manage and solve all problems as whole rather than departmental problems. This allowed the Internet banking development team members to manage and perform an effective operation of Internet banking maintenance and modification.

During the action research process, the findings indicate that holistic scenario technique generated several significant contributions. There is a single theme emerge in holistic scenario. The theme is:

- 5.3.1: A holistic scenario allows team members to categorize, and prioritize problems by using the factor model and a systematic approach.

5.3.1: Holistic scenario allows team members to categorize, and prioritize problems using the factor model and a systematic approach

The factor model is the group activity for problem identification which aims to combine all departmental problems into team problems. The main contribution from the factor model is the ability for team members to perceive a completed view of Internet banking maintenance and modification problems, arrange floating problems into main categories, and prioritize problems based on their urgency levels. The other benefit of the factor model is that the model assists team members to adopt a systems approach for Internet banking maintenance and modification. There are three propositions in the data which support this theme. These propositions are:

- 5.3.1.1: The factor model allows team members to see the complete view of problems from Internet banking maintenance and modification:
- 5.3.1.2: Categorization and prioritization allows team members to formulate effective action plans: and
- 5.3.1.3: Systems approach allows team members to perform end to end problem-solving with no side effects for action plan implementation.

5.3.1.1 Factor model allows team members to see the complete view of problems

The factor model and departmental participation create a completed view of Internet banking problems because when team members come to work together, they have an opportunity to discuss, participate and share their departmental problems and working experiences to the other team members. In reality, before the action research project, each department worked individually and had no opportunity to contact or discuss issues with the other related departments. The only contact that team members had in the previous working process was with the Vice President of e-Strategy e-Commerce and e-Banking Division who was in charge of the overview of Internet banking

maintenance and modification. One team member mentioned in her reflection interview that:

> *Previously, I only discuss with marketing department, I have no chance to discuss with other departments and also in rare cases, I have little chance to talk but not with all departments at once. So I will not see the whole picture regarding the other departments' problems. I can see the whole picture because it includes the problem from many departments.*
>
> *(IBDT 03/Q1.1)*

The departmental problems are generated from all team members, based on their experience and departmental problems. This is the most effective way of Internet baking problem-solving because team members can arrange all departmental or floating problems into some major categories. One team member agrees on the usage of the factor model and stating that "*The use of factor model helps team members classify all problems into teams*" (IBDT 03/Q1.1).

The use of the factor model transforms all problems from an individual level to a team level. There is no longer a departmental problem, everyone shares a team problem.

> *When everyone brings their problems, we do the factor model and group the problems in to categories. The problems have been transferred into team problems; it is not an individual problem anymore. The problem has been turned in to new categories not by departments. One category includes problems from many departments. Therefore, team members have their responsibility in all categories.*
>
> *(IBDT 04/Q4.9)*

By using the factor model, there is a shift from particular problems to systems problems. The formulated action plans are for the whole Internet banking system. The team leader claims that:

> *We create the factor model in order to identify problems, then when we know the problems we can formulate action plans to address all problems. It is a very helpful model. It is also the action plans for the whole Internet banking systems not for a particular problem.*
>
> *(IBDT 04/Q1.2)*

An additional benefit of using the factor model, the team leader believes, is that apart from grouping all departmental problems, the factor model also groups all problems into the systematic model and creates a written document that can be a reference and guideline. He explains that:

> *Actually, the bank also does this kind of activity, but it is not a systematic one or formatted one. We do in short term, we do factor by factor. But your action research creates more systematic thinking about the factor model. It looks as if there is a long term plan. It is more systematic than before …… there is no one who has done this factor model before. There is no model and written documents. We have the model, structure and guideline; it will be a lot easier to explain by using the model. It is a very good model.*
>
> *(IBDT 04/Q1.1)*

The factor model group all floated problems into some major groups which changed the structure of the problems from departmental to team problems. Therefore, it creates the systematic structure of problems which allows the Internet banking development team to manage all floated problems into manageable problems and all problems will be able to be assigned to the project owners.

Team leader also admits that "*before you (the researcher) came to work with the bank, I also did like this but we do not have team orientation, it is problem-solving, all departments list their problems and then we find the actions to take*" (IBDT 04/Q3.1). There was a centralization of problem-solving. All problems were sent to the marketing department and all solutions and action plans were distributed from marketing department to other related departments.

In this case, without the factor model and departmental participation, team members have never even discussed problems with the other related departments. Team members know and understand only their own area and departmental problems. Therefore, one team member says that she understands the broader view of Internet banking because the factor model combines all problems from related departments into one systematic model. She argues that "*I can see the whole picture because it includes the problem from many departments*" (IBDT 03/Q1.1).

Another team member also agrees and supports this:

> *I can see a clear picture and the context of Internet banking. If we do not use the factor model we will see only personal perspective and the factors based on work experience. This will help us see the complete and clear picture of Internet banking.*
>
> *(IBDT 02/Q1.1)*

It is clear that the usage of the factor model creates a significant impact on and contribution to the Internet banking development process and team. The team leader agrees and appreciates and he praises it saying that "*it is a very helpful model. It is also the action plans for the whole Internet banking systems not for a particular problem"* (IBDT 04/Q1.2).

5.3.1.2 Categorization and prioritization allows team members to formulate effective action plans

In the Internet banking development process, there are too many floating problems. Team members need to identify and group all problems into categories. It is extremely and relatively difficult for team members to target floating problems. Therefore, team members need to choose and target the urgent problems and solve the less urgent problems. The team leader shares his opinion regarding how to deal with broad range of floating problems.

> *There are too many floating problems; we can not complete the whole operation. We need to have guidelines and strategies because if we do not have guidelines, the work is never complete. We may not be able to achieve ten targets but we can choose or group them into a few categories and then focus only on those categories.*
>
> *(IBDT 04/Q3.2)*

Once all problems are grouped into categories, all problems are not floating problems. The floating problems are hard to identify and assign to the project owners. The categorization of problems assists Internet banking system development team to assign the project owners.

> *For example, this kind of problem, how can we solve the problem and who will be the in charge for the particular problem? We can find the method and system, for this kind of problem, what the problem is, then how to deal with the problem, what the solution is, and then we can formulate the solutions*
>
> *(IBDT 01/Q1. 2)*

Systematic prioritization refers to the priority of problems based on their urgency level. Different problems have different urgency levels. Systematic prioritization of problems allows team members to identify the significance level of problems and assisted team members to plan and allocate resources to fit with the flow of problem-solving plan.

During discussions, team members share their departmental problems and group all problems into some major categories. The problems are prioritized and project owners are assigned to them. The priority of problems allows team members to plan the operational flow of problem-solving. Team members identify the top priority problems and these problems have to be addressed and solved immediately.

> *From talking with all members, we discuss and collect all problems from all members, this helps us to plan better and sort out the priorities better. So we have a better plan and know which problem is an emergency problem which has high priority, which action plans should be implemented first and later on.*
>
> *(IBDT 01/Q1.2)*

In reality, it is impossible to solve all problems at the same time and as quickly as possible. Therefore, team members need to carefully select the top priority problems to be addressed.

Once problems are identified for project owners, team members and project owners help each other to generate potential solutions and action plans to address and solve the problems.

> *The formulated action plans can directly address the particular problem; also we will have the problem's owners who will take responsibility to solve the particular problem.*
>
> *(IBDT 04/Q5.1)*

Team members formulate action plans based on the priority of problems. This way problems have been solved based on priority rather than department.

Another team member agrees that problem prioritization allows team members to manage the priority of problem-solving. She posits that *"it must be good because all the problems have been collected and combined together. So we will know what are* ***the real problems*** *and what are the* ***emergency or critical problems*** *that need to* ***be addressed immediately****"* (IBDT 03/Q5.1). The main advantage of problem prioritization is team members address correct problems at the right time.

Team members identify the steps of problem-solving based on the urgency of problems. One team member realized that she has a clear understanding about the flow of problem-solving steps because team members rank all problems based on their priority. When the highest priority has been addressed and solved, the lower priorities will be followed up and solved in due course. She explains

> *When we table all problems and sort out their priority, we know the steps of problem-solving . . . we have a clear idea and framework in terms of how to deal with the problems; we can prioritize the urgency level of problems. So we can formulate the action plan correctly and promptly.*
>
> *(IBDT 01/1.2)*

Therefore, team members perceive the correct timeline and work schedule for all problems to be solved and team members also have an ability to take immediate action and implement prompt action plans.

The other significant benefit of problem prioritization is that the team leader could manipulate and allocate manpower to address the top priority problems. The team leader says, "*so we can allocate resources by prioritizing the problems based on the urgency of problems. We can solve the big issues, while before we may solve some small problems*" (IBDT 04/Q1.2). This shows that prioritization assists team members to solve a significant problem which is differs from the previous Internet

banking maintenance and modification process which only solved some small problems not the original and complete problems.

In summary, problems have been assigned project owners and prioritized based on the level of urgency. Team members have an ability to manage and solve all problems concurrently, correctly, and effectively.

5.3.1.3 Systems approach allows team members to perform end-to-end problems-solving with no side effects from action plans implementation

Problems in the Internet banking maintenance and modification process relate to many departments and there are no clear boundaries and milestones regarding the starting and finishing points of the problems. It is necessary for all problems to be solved at the same time by all departments. The web designers who are mainly involved, and dominate Internet banking design, accept and agree that "*problems will be never ending; there is no starting point for solving the problem; therefore, all problems need to be solved at the same time by everyone who is involved with Internet banking*" (IBDT 01/Q2.1).

The Internet banking maintenance and modification team addressed the problems and many were addressed and handled at the same time by different project owners. This type of problem-solving is a whole system approach, not departmental problem-solving as in the previous process.

The systematic approach refers to an approach that aims to solve Internet banking problems as whole systems rather than departmental problems. Prior to the action research, all related departments worked and solved Internet banking problems within their departments. There was an internal problem-solving approach. There was no involvement from the other related departments. This is in contrast with the systematic approach, where team members bring their departmental problems to share with the other team members and all departmental problems are accumulated and blended into team problems. There is no partition or boundary within team problems.

Team members share all the team problems. All problems will be solved by the Internet banking development team rather than single departments.

The systematic approach allows team members to see and understand the clear scope of problems and have a comprehensive view of problems. Some problems need more than one department to solve them and some problems have side effects on other departments. Therefore, for Internet banking development team needs to adopt a systematic approach and solve the problem as a whole system. This will ensure the implementation of action plans that do not consequently affect or interrupt other departments' work. The major benefit of the systematic approach is team members perceive a complete set of problems and foresee the potential side effects of action plans during the action plan formulation process.

Prior to the action research, some action plans have been successfully implemented and achieved the objective of a particular department. However, there have been some consequences after action plans have been implemented. There can be an accidental side effect which interrupts the operational systems. This issue can not be prevented if an Internet banking system has been developed individually or separately by single departments. One of the team members who looks after Internet banking operational systems development shares this comment.

> *Yes, we can formulate the effective action plans because we will know what marketing wants and what are the problems that Asia phone have to deal with, in terms of technical support, I will then know that what I can do to support all parties. We know all problems, so we can solve problems directly.*
>
> *(IBDT 03/Q1.2)*

> *She continues*
>
> *When we want to formulate some action plans we need to gather people who have knowledge, and have been involved in the work. We should have better action plans than are formulated from one person.*
>
> *(IBDT 01/Q5.1)*

Her comment confirms that in order to develop or smoothly modify the operational systems of Internet banking, the Internet banking development team needs all the requirements from all the related departments and all the related departments need to work together as a team. Then, the potential side effects from the implementation of action plans can be foreseen and prevented. The IT manager supports this approach, saying that it assists her to develop and construct smooth Internet banking operational systems.

During the action plan formulation, team members approve and accept the selected action plans and the approved action plans do not create side effects. One team member asserts, "*we know all the problems, so we can solve problems directly; the action plans will not have any side effects on the other team members"* (IBDT 03/Q1.2). *"Also all solutions are accepted from many team members. There is no error or side effect on the systems or the other team members*" (IBDT 03/Q3.2). There are not only no side effects but also the implemented action plans had fewer errors or were error-free.

All action plans have been formulated by the entire team who are experts in their field of Internet banking.

> *When we share the same problem, each individual member will bring their experience to solve the team problems. Also we have many members to provide solutions and suggestions. Problems will be corrected accurately and effectively. The solutions will not affect other members' work and the solutions will solve the problems.*
>
> *(IBDT 02/Q4.10)*

There are real examples regarding how side affects occurred during the previous Internet banking development process which adopted a departmental approach.

> *Previously, each department solved problems separately; for example, when IT changed or modified any applications, the modified application may affect the operation. Operation solves problem, some time the solutions may have an effect on end-users. The problems are not completely solved. One problem has been solved, and two new problems happen.*
>
> *(IBDT 04/Q4.10)*

The unexpected problems always came back and annoyed team members during the previous Internet banking development process, This happened because they were not be able to foresee the likelihood of unexpected problems or potential side effects.

The other real example comes from the IT support department. The team member shares one good example of side effects regarding systems performance and structure. When team members do not solve problems at the same time as the team, the IT support department responds to other department's demands bit by bit. The systems were modified and changed, based on departments' requirements. This type of problem-solving causes a confused and complicated system structure. As a result, the system's performance decreases. She shares her experience and suggests that the best solution is that she will be able to manage and plan good systems structure when she knows and receives all requirements from all team members at once.

> *There is one case, previously, many departments requests bit by bit, I have to create bit by bit, it makes confusion in the systems structure. The systems perform so slowly. Therefore, we come to talk as whole teams. I will understand and realize all the requirements and I can manage and plan for the systems structure.*
>
> *(IBDT 03/Q1.2)*

The team leader emphasizes that an Internet banking development team needs to work together as a team and share all departmental problems with the entire team. Therefore, the Internet banking team has a team's ability to perceive the whole picture regarding Internet banking development problems. This ability assists the team to implement an end-to-end problem-solving approach. He emphasizes

> *If we share all problems together and solve problems together, we can solve the whole problem together. We need to solve end-to-end, solve the whole systems. This is very important.*
>
> *(IBDT 04/Q4.10)*

The team leader also explains how team members cooperate with each other in end-to- end problem-solving in order to prevent side effects from the implemented action plans. The team leader explains how this systems approach worked well during the

Internet banking development process under the action research process. He illustrates his point thus.

> *When we share knowledge, we solve problems directly and accurately. We see the side effects that when we take actions to correct this problem, do these actions have an effect on any department? I want to correct the application; if I do it alone with IT, operation is not involved, operation does not know and support it, I will not know that this application does not fit with operation. So when you want to solve or modify application, IT said systems support, operation said it fits with operation, web development said it can be designed, call center realizes the change. We discuss one and finish all processes. It is very productive and effective. One shot finishes all.*
>
> *(IBDT 04/Q3.4)*

The systematic approach is an end-to-end problem-solving strategy that works well for the Internet banking development team during the action research process. The team leader appreciates this, and gives high credit to the systematic approach and praises it, saying

> *it is end-to-end problem-solving. If you do not do end-to-end every time, you will always have problems and we need to step back. It is a waste of time and feeling.*
>
> *(IBDT04/Q5.1)*

When the Internet banking team performs end-to-end problem-solving, all action plans address and solve problems correctly and effectively. This type of performance promotes effective performance of the Internet banking maintenance and modification process.

> *Therefore, the action plans will address the problems more accurately. Also, all problems from all departments will be solved. The action plans will be complete and solve all the problems regarding Internet banking services and products. The overall performance of Internet banking services will improve and be enhanced.*
>
> *(IBDT 03/Q5.1)*

For the Internet banking maintenance and modification process, it is necessary for team members to combine all departmental problems into team problems. Then the

entire team is able to perceive and foresee the potential side effects of implemented action plans.

The number of errors in problem-solving also reduces because team members do not perform separately as in the previous Internet banking maintenance and modification process. The new process is operated by a team which has a complete set of skills and knowledge of Internet banking development. Team members learn from each other, resulting in a reduction of errors in the Internet banking maintenance and modification process. The web designer agrees

> *We learn the whole process, we can do the work easier and it is more convenient than before working as a team. The amount of error is reduced.*
>
> *(IBDT 01/Q4.6)*

In addition, the strategies and action plans which have been formulated by team members from related department. These action plans will be a completd action plans. The team had opportunities to formulate and complete effective strategies and action plans because these strategies and action plans include all departmental problems and the possible solution from experts in the problem areas.

> *When we have a team of experts come to work together as a team and the team realizes the problems, the team members are will definitely be able to formulate accurate action plans because the team has various capabilities, knowledge, and expertise.*
>
> *(IBDT 02/Q5.1)*

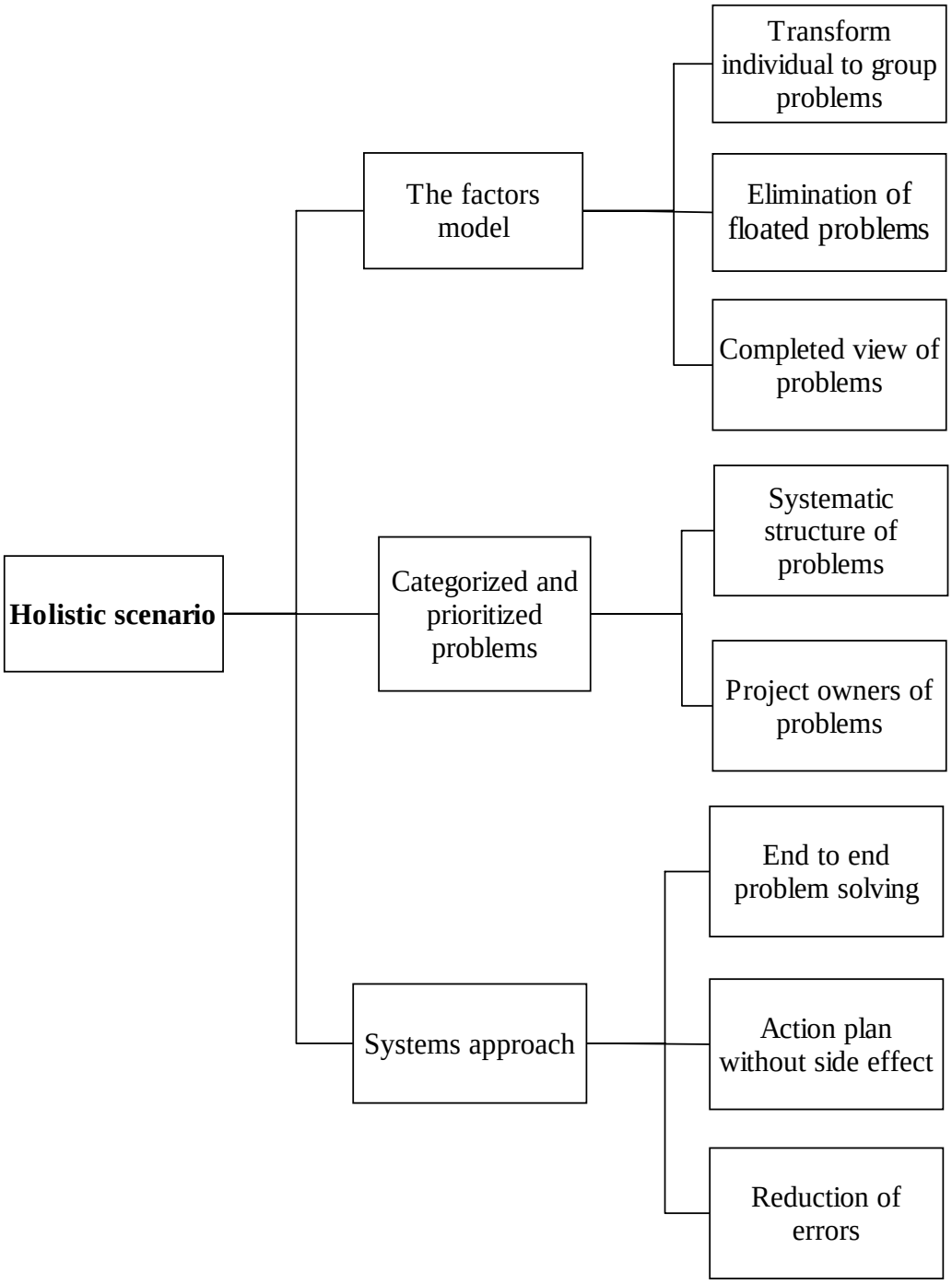
and

> *There will be a variety of expertise in the team when people come from different working experience and expertise. The various skills and expertise will help the team to produce and work effectively and completely.*
>
> *(IBDT 02/Q3.2)*

Therefore, the reduction of error is the key indicator for the improvement of the Internet banking maintenance and modification process.

Figure 5.6:

Summary of the factor model and systems approach theme



5.4 Management support

Management support refers to the support from top management teams (TMT) that provide all resources including time, human resources, investment, and authority to team members to develop Internet banking services. Internet banking maintenance and modification team members need significant support from their boss. This is because, in the Thai organizational context, the boss remains the absolute power and authority to make all decisions and set all directions for a project. The cultural difference has an high level of influence on the Thai boss-subordinate relationship in terms of power distance according to Hofstede (1984). The relationship between boss and subordinates is unequal in terms of organizational position and status. Thai bosses are always in a superior position and hold absolute power. Thai subordinates are highly affected and dominated by the boss's immense power and authority. As a result, all decision-making and direction are instigated by the boss.

During the action research process, the researcher introduced two interventional change techniques: departmental participation and equal participation. The researcher expected to create a new working environment within an Internet banking maintenance and modification team. In order to achieve Internet banking maintenance and modification process improvement and exploit the comprehensive benefits of these two techniques, the researcher believes that, the relationship between boss and subordinates needs to change. Because power distance has a significant impact on the boss-subordinate relationship, in order to alleviate the impact of power distance, top management level needs to encourage their subordinates to participate rigorously. Top management has to provide equal opportunities for their subordinates to discuss their ideas and express their opinions during the team meetings.

For Internet banking systems, management support plays a significant role in the developing process. Four themes emerged in the management support category. During the action research process, the findings indicated that management support technique generated several significant contributions for the Internet banking maintenance and modification team and process. The four themes are:

- 5.6.1: Management needs to change their leadership role and power to control;

- 5.6.2: Management needs to encourage equal participation during group meetings and discussions;
- 5.6.3: Management needs to provide sufficient resources; and
- 5.6.4: Management needs to establish a key performance index (KPI).

5.4.1: Management needs to change their leadership role and power to control

Power distance has significant impact on the relationship between boss and subordinate. Power distance refers to "the extent to which less powerful members of a society accept the fact that power is distributed unequally" (de Mooij & Hofstede, 2002, p 61). In a high power distance country, people respect old age and status as an important indication of power. Thailand is one of the high power distance countries on Hofstede's Power Distance Index (PDI). One proposition emerged on this theme. The proposition is:

- 5.4.1.1: Change of leadership role and control of power can alleviate the absolute power

5.4.1.1: Change of leadership role and control of power can alleviate absolute power

During the action research process, the researcher observed that n terms of the relationship between the Thai boss and his or her subordinates are clearly separated; the boss remains distant from his or her subordinates. They do not have a close personal and working relationship. The boss expects respect from his or her subordinates. Therefore, during team meetings or discussion, subordinates have to wait and listen for directions and commands from their boss.

This situation is ubiquitous in the Thai organizational context. One of the team members who has a high organizational position shares his experience regarding the boss and subordinate relationship. He mentions that in general, subordinates listen to the boss's command and direction to perform work. He illustrates and gives his personal experience. "*Am I the owner? If I am a junior I may not feel that I am project owner, I do it because the boss commands or requests me to do. I still feel*

that I am subordinate and junior staff, I am not the project owner" (IBDT 04/Q4.). This example reflects that the project always belongs to the boss and subordinates are project supporters and workers. Subordinates do not believe or think that they are the project owner. There is no sense of ownership in a general Thai management or organizational context. The impact of power distance in the Thai organizational context and the boss and subordinate system is reflected in two main forms which are domination of discussion and maintenance of absolute power of decision-making and command.

In terms of domination of discussions, Thai bosses and subordinates have different mindsets regarding team participation and discussion. There is less opportunity for subordinates to discuss and present their ideas and comments without the boss's permission. In other words, subordinates participate and discuss when they are allowed to do so. One of the team members who is a team leader of the Internet banking development team admits and accepts that there is a boss and subordinates system in the Thai organizational context. This is how he explains the power distance in Thai organizational culture.

> *Equal participation is a good technique but when we use it in the Eastern country it may not fully work because in Thai culture, we still have boss and subordinate systems . . . . In an Eastern country, the subordinates can speak or discuss if the boss is absent or the boss ask you to speak or answer when the boss wants the subordinates to present and show their opinion to the team and in front of their boss. There is scant possibility for subordinates to give their opinion.*
>
> *(IBDT 04/Q2.1)*

This comment reflects the fact that subordinates are afraid to present their ideas in front of their boss which is how the boss influences proceedings during team participation. This is common in Thai organizational culture. Everyone in organizations accepted and agreed and is accustomed to this relationship. This type of relationship shapes and has a significant impact on the context of team discussion, participation, and decision-making. There is a consequence from a boss's domination of discussion. The following comment comes from the team leader. He points out

> *If you do not allow other members to participate, the idea will come from one person. It will be like this is what I (boss) want, and you (subordinate) need to do it, and everyone will respond based on boss's command, they will not do because they like to do, they do it because they have to do it.*
>
> *(IBDT 04/Q2.2)*

Therefore, when subordinates do not fully discuss and participate, the main ideas and directions come straight from the boss who possibly has a limited or narrow view and scenario. The boss and subordinates systems also have an influence on how decisions are agreed.

The other form of power distance is reflected in terms of decision-making domination by the boss. During the team meetings or discussions, a Thai boss not only dominates all discussion, he or she also dominates decision-making. In the Thai organizational context, the boss receives high respect from his or her subordinates. The boss maintains absolute power and authority to make all decisions and offers promotion or pay rises for his or her subordinates. These issues place the Thai boss in a supremacy status in organizations. There is no subordinate who wants to go against his or her boss. One of the team members states, "*sometimes they like to speak more but they feel like they can not say everything*" (IBDT 04/Q2.3). Another team member also agrees and admits that "*in normal situations, when the boss says left, we need to go left, even though the direction to go left is not quite correct, we need to do and follow the boss's commands*" (IBDT 03/Q2.3). This evidence suggests that the boss maintains a high level of power and authority for all managerial contexts. Subordinates need to listen and respond based on their boss's commands and instructions.

Another real example came from a team member. He shares an example based on his experiences that "*normally, in Thailand, when the boss has been challenged by a subordinate, the boss will not follow and will resist changing decision*" (IBDT 04/Q2.2). This is regardless of whether it is good or bad, when the decision has been made by the boss. The decision is final and needs to be implemented by subordinates. A boss ignores all suggestions and has a feeling that he or she has been challenged by

subordinates. Therefore, in order to keep his or her absolute power, the boss has to remain adamant and ignore all suggestions from subordinates. The following comment supports this argument and reflects boss's absolute power quite well. The real life example is *"it is true that if you are junior, you have one voice: one vote but your boss has one voice: fifty votes. You can not override your boss's decisions, especially in Thai culture. You vote ten voices while boss votes one voice; boss's one voice overrides subordinates' ten votes*" (IBDT 04/Q4.1). This example clearly shows the strength of the boss's absolute power. This is a common issue in the Thai management organizational context.

Using the actual situation during the action research process, the researcher and the vice-president of the e-banking division have attempted to promote equal participation within the Internet banking development team. The level of team member participation has still not been fully achieved. The vice-president, who is one of the team members, reflects

> *There is no one who is a dominant participant during team meetings. When I lead some discussion, they will support the ideas and that is the finish for them. It is a cultural thing that is hard to change. The adopted technique is good but not quite practical in the Eastern context. The idea is good but it can be implemented only 40-50%.*
>
> *(IBDT 04/Q2.1)*

The idea and theory of equal participation is good and practicable, but it is not quite convincing especially in the Eastern, Thai organizational context.

However, during the Internet banking maintenance and modification process improvement, the researcher and team members realized and discovered that there is one significant factor that promotes the full potential of equal participation and alleviates the impact of power distance. The factor is encouragement for equal participation.

Open-mindedness is a challenging issue for changing Thai bosses' working attitudes; it is significantly difficult to change their attitudes because they have always had absolute power and authority. Thai bosses have highly superior organizational status

and position and they have been well respected in the organization. Thai bosses always believed that their ideas and opinions are almost excellent ideas and opinions. They have a large amount of working experience and organizational tenure. In reality, they are at the top level and they perceive only the top level viewpoints. They have no chance to see the practical issues and current problems of the actual working context. Therefore, it is important for bosses to listen and accept their subordinates' ideas, opinions and suggestions because subordinates are the people who deal with all operations and current problems. They are the experts in their areas. They know and understand the problem and they know how to solve problems. Bosses have to change their mindset and be open for new ideas and suggestions and allow their subordinates to express and share their ideas. The Internet banking team leader, who holds the vice- president of e- baking division position, agrees that

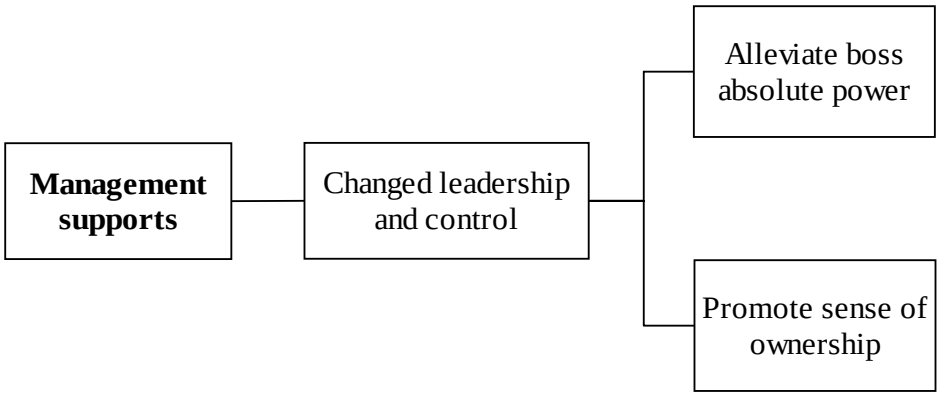
> *To encourage people to speak, the boss needs to be very open, when people show their opinion. The boss should not stop or argue all the time. It is not right, it is not correct; it should be like this, like that. This is not what I want. A boss also needs to accept all suggestions, when everyone agrees that they are useful suggestions.*
>
> *(IBDT 04/Q2.3)*

The team leader needs to let the dialog flow fluently during group meetings and team discussions. Team members feel closer to the project and feel more comfortable when they be able to add some input into the team. They feel that they are part of the whole project and this creates a sense of ownership. The team leader shares his ideas regarding how to create a sense of ownership among team members. He comments that "*it is up to the team leader, whether you will give team members a chance to have a sense of ownership. In our case, I am open to a sense of ownership in our team. So everyone has ideas and shares ideas*" (IBDT 04/Q4.1).

This Internet banking maintenance and modification process improvement project was fortunate that the team leader is an open-minded boss and allows all team members to discuss and participate openly and equally.

Figure 5.7:

Summary model of changed leadership role theme



5.4.2 Management needs to encourage equal participation during group meetings and discussion

Encouragement and stimulation from management is a supportive environment for team discussion and participation. The effective level of participation depends on the quality of discussion during the meeting. The research showed that the encouragement and stimulation to participate could be achieved when the boss had an open mindset and subordinates had a good relationship with their boss. Therefore, the boss's mindset and relationship were the two foundations for achieving encouragement and stimulation. There are two propositions from the data which supported this theme. The two propositions are:

- 5.4.2.1: Encouragement from management plays a significant role in equal participation; and
- 5.4.2.2: Equal participation promotes a high degree of willingness and openness to participate.

5.4.2.1: Encouragement from management plays a significant role in equal participation

Encouragement is one of the important factors for equal participation. The researcher believes that encouragement from management or the team leader has a significant

influence on the team members' participation. Therefore, in order to exploit the full benefit of equal participation and alleviate the impact of power distance, management or the team leader has to stimulate and encourage team members to participate openly and rigorously. Encouragement and stimulation from management produces a supportive environment for team discussion and participation. The effective level of participation depends on the quality of discussion during the meeting. The research shows that encouragement and stimulation to participate can be achieved when the boss has an open mindset and subordinates have a good relationship with their boss. Therefore, the boss's mindset and relationship are the two foundations for achieving encouragement and stimulation.

During the action research process, there was an outstanding example of encouragement and stimulation from the Internet banking maintenance and modification team leader. He showed a great mindset and attitude toward teamwork. He believes that "*for our team, we encourage everyone to speak and participate*" (IBDT 04/Q2.1). He also understands and agrees with the importance of encouragement and stimulation and that "*the boss needs to stimulate and encourage them to participate and use their opportunity*" (IBDT 04/Q2.1). This is because once team members participate openly and equally, they provide and generate useful ideas, and information for the Internet banking maintenance and modification process. He believes that "*we need to encourage them to speak openly and speak everything that will be useful to the team*" (IBDT 04/Q2.3).

The ultimate goal is to create a sense of ownership among team members. The possible and practical way to create a sense of ownership is to encourage team members to participate equally and openly. Therefore, team members have an opportunity to add input to the team and they feel that they own parts of the project. Team members have the right to decide what to do to complete the project. The team leader illustrates this: "*putting them together does not create sense of ownership, but we need to stimulate them to use their right to participate equally, one voice: one vote*" (IBDT 04/Q4.1).

There are some issues that need to be managed and organized in order to achieve and exploit the full benefit of equal participation. First, the boss has to open his or her mind, listen, and accept contradictory ideas and opinions. Secondly, the boss has to develop a less tense relationship with subordinates. Lastly, the boss plays a supportive role during team meetings by encouraging and stimulating equal participation within the team. However, there are two additional factors that have an indirect impact on equal participation. These are subordinate personality and relationship with the boss.

In general, the personality traits of Thai subordinates are introversion and obedience. The typical subordinates are good listeners and followers because they are used to the boss's commands and orders.

There is an interesting example from one of the team members. She argues that once she has the right to argue equally, she argues seriously. In contrast another team member is basically afraid to argue with her boss even when she is right. This team member illustrates one interesting real example:

> *For example, IBDT XX (one of the team members) may not dare to argue with her boss and may not utilize her right to discuss openly. But, in my case, I and my boss are easy and happy. There is no ranking in my brain if there is something wrong, even though he is my boss. I will say it out loud. I can say that if you give me the right to participate, but some people may not use the right, it depends on individual personality.*
>
> *(IBDT 01/Q2.3)*

In this case, the subordinate's personality trait plays a significant role in the level of participation. However, there is the factor of the relationship between boss and subordinates involved in the level of participation as well. In this case, this team member has a nice and relaxed relationship with her boss; this relationship encourages and allows this subordinate to participate equally and openly during team meetings.

5.4.2.2: Equal participation promotes high degree of willingness and openness to participate

Willingness to participate encourages team members to provide useful information for the Internet banking development team. The degree of willingness encourages team members to participate during team meetings and discussions. Team members always provide useful information and critical thinking if they are allowed to discuss issues. Equal participation promotes and encourages the degree of willingness. Willingness to participate encourages Internet banking team members to provide useful information for the Internet banking development team.

There was a relatively low degree of willingness during the previous Internet banking development because team members had fewer chances for discussion and participation in the process. The researcher believes that the critical and significant information for Internet banking development derives from team members when they are keen to participate. Team members provide and share valuable information to other team members when they have a willingness to participate.

It is clear that during the action research process, team members felt more comfortable and had high motivation to participate when told that within this Internet banking maintenance and modification team, they would have an equal opportunity to participate, discuss, and communicate. One team member admits *"We will be keen to participate and discuss when everyone has equal rights to participate"* (IBDT 02/Q2.1). This statement shows that equal participation stimulates the level of willingness to participate.

Another team member supports this argument and explains that all departments have a certain number of departmental problems which need to be shared with the other team members. Therefore, all team members feel free to share their departmental problems when they perceive that there is an equal participation. She admits that "*team members will feel free to participate if they have equal opportunity because everyone has problems that need to be explained and informed"* (IBDT 03/Q2.1). There is a need to inform other team members regarding departmental problems, and

equal participation provides the opportunity to share problems with all team members.

The highlight of willingness is sharing information between team members. During the action research process, there was a high level of information-sharing among team members. Within the Internet banking development team, the researcher and the team leader regularly encouraged and emphasized equal participation and the right to participate equally. The team leader confirms that "*The benefit of willingness to participate was the useful information from team members. When team members are willing to participate, they will give useful information and perform well*" (IBDT 04/Q2.2). The useful information derives from team members when they have an opportunity to express and share their information.

Therefore, the degree of willingness and equal participation are stimulated and support each other in terms of creating information-sharing among team members. When team members have equal opportunity to participate, the equal participation creates the sense of freedom to discuss and participate.

Degrees of openness encourage team members to critique and argue all issues in the Internet banking development process. The degree of openness creates the feeling of freedom and openness to discuss and make legitimate arguments during team meetings and discussions without fear of power distance or unequal relationship between boss and subordinate. Openness creates quality discussions and decision-making.

The quality of discussion is also the subject to the level of openness. The equal participation creates willingness to participate and allows open discussion among team members. There is a change in the communication process between departments. In the previous Internet banking development process, there was no departmental and equal participation. All related departments worked independently; there was no opportunity for staff from related departments to communicate with each other. Since the introduction of departmental participation and equal

participation, these two techniques have created an excellent opportunity for team members to discuss and share their ideas, opinions, and problems. The equal participation provides an opportunity for team members to ask and debate all issues regarding Internet banking development. Team members have chances to present ideas and receive feedback from other team members. Team members believe that equal participation generates good communication channels. One explains that

> *When we have equal rights to participate, we have a chance to ask and discuss and learn about others' work. We have a chance to ask questions and exchange ideas and opinions. We can present ideas or raise issues for discussions in my point of view for others to see another view.*
>
> *(IBDT 02/Q2.1)*

The open discussion creates broad views of Internet banking development. Team members understand the other aspects of the Internet banking development process.

The quality of discussion depends on the content and intensity of the discussion of team members during the group meetings. The researcher noticed that open discussion promotes quality discussion because the degree of openness has a direct influence on the content and detail of the discussion. Team members feel free to present their ideas and opinions when there is open discussion among team members. The IT manager also supports this, noting that *"open-minded discussion promotes a high quality of discussion among team members. If we have an open-minded discussion, team members will definitely express their opinions and problems*" (IBDT 03/Q2.1). The open-minded discussion provides depth and insight to dialogs among team members.

The other explanation for the relationship between equal participation and open-minded discussion is supported by the customer service manager. She believes that when team members have an equal right to participate, they feel comfortable about presenting and discussing their ideas. Team members have the courage to argue with other team members because team members always support their arguments with facts. The team leader mentions that **"***in our team, everyone participates quite well, when everyone presents their ideas, they normally have some information to back up*

their opinion. Team members speak based on reality and actual situations, so they speak with confidence" (IBDT 04/Q2.2). Team members have freedom to discuss a broad range of issues in the field of Internet banking maintenance and modification. There is no issue regarding organizational position and status within the Internet banking maintenance and modification team. A team member supports this argument, "*there is a high possibility that team members will participate openly, when they have no fear about the work status*" (IBDT 03/Q2.3). Everyone has an equal right to participate and argue. This working context promotes a high quality of discussion and participation.

Another member also supports this and explains how equal participation creates open-minded discussion. The team member says

> *When we have the sense of equal participation, our minds will be open. We can speak and talk about whatever we like. We can talk and discuss everything, and this is turn encourages people to feel free to discuss and participate . . . We also don't have to care about who is the boss or if we are subordinate. We are equal in the team. We have equal opportunity to discuss and speak. Boss and subordinate have the same opportunity to speak. People will be encouraged to speak openly; they will speak about whatever has impact to work.*
>
> *(IBDT 02/Q2.3)*

There is equality in terms of organizational position within the Internet banking development team. Team members have been encouraged to discuss openly and they take their chance to participate equally and seriously. This working context creates a significant impact on the Internet banking maintenance and modification process. The team performs well because team members add input to the team and discuss it openly during the team meetings. There is a significant change in the way that all related departments cooperate and communicate to each other.

> *In case of everyone opening their mind, people will come to work together and not be afraid to speak and discuss. In reality, when people are open to each other, we will have good performance.*
>
> *(IBDT 02/Q2.4)*

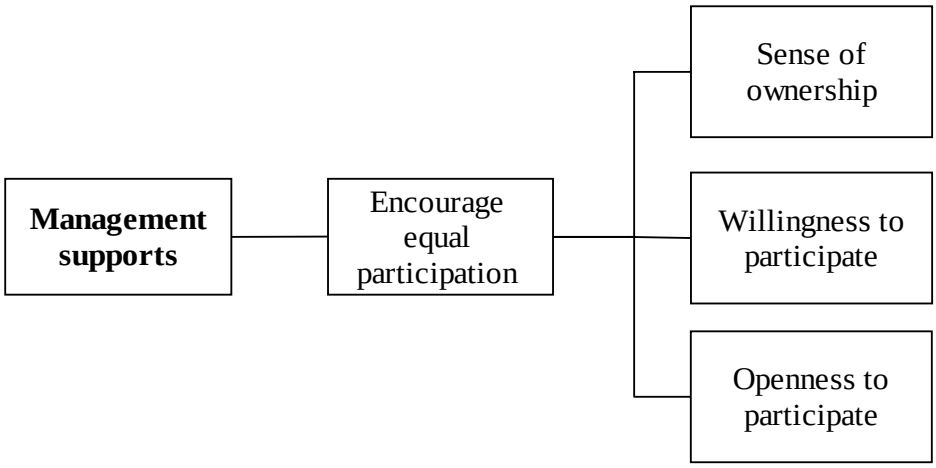
There is no fear about organizational status and position within the Internet banking maintenance and modification team. Therefore, the quality of discussion will improve when the team has equal participation and open-minded discussion.

Open discussion promotes and creates high quality team discussion and participation. Departmental participation and equal participation are useful techniques for Internet banking maintenance and modification process improvement. These two techniques encourage team members to work together and share their knowledge and information. Knowledge and information-sharing create significant outcomes in terms of greater understanding among team members, good relationships among team members, and smooth Internet banking development operation. Team members agree that "*there is a great discussion among team members and shared information, knowledge, and experience. This creates better understanding of the Internet banking maintenance and modification process and we work together smoothly. We understand others' working process, problems and limitations*" (IBDT 02/Q3.4) and *"When people work together as a team, the team develops and creates good relationships among team members and understands the nature of others' work. This situation helps teams work well together and work efficiently*" (IBDT 02/Q5.1).

Equal participation creates a good working atmosphere within the Internet banking maintenance and modification team. There is a high level of willingness to participate, a high level of openness to discussion, and a high level of understanding regarding the overall Internet banking maintenance and modification process. These significant outcomes promoted and created an effective team performance for Internet banking development toward process improvement.

Figure 5.8:

Summary model of need for equal participation theme



5.4.3: Management needs to provide sufficient resources

The success of an Internet banking maintenance and modification project depends on the level of support from management. Management support includes sufficient human resources and time allocation. The Internet banking development process involves many departments and within each department requires a large amount of work and people to execute the Internet banking maintenance and modification tasks. The process needs large numbers of people and amounts of time to develop and implement the new features and functions. Such a proposition emerges from the data. The proposition is:

- 5.6.2.1: Human resources and time need to be allocated adequately.

5.4.3.1: Human resources and time need to be allocated adequately

Human resource is one of the significant inputs for the Internet banking maintenance and modification process. Internet banking maintenance and modification needs not only involvement and support from many departments but also requires high investment. An Internet banking system is a complex information system. There are large numbers of problems ranging from day-by-day problems, on-going problems,

and critical problems. Everyday, the Internet banking maintenance and modification unit receives new reports regarding customers' problems, customers' complaints, and extraordinary requests. The Internet banking maintenance and modification team attempts to solve and address emergency problems and at the same time they endeavor to deal with the chronic problems.

In the case of the Internet banking maintenance and modification team during the action research, team members were invited from all related departments, and team members come to work together as team. There are six members, including the researcher, in the team. Each team member is an expert in their areas and hold manager level positions. In terms of numbers, it is a relatively small number of people even though they come from all major departments. There is only one person to represent each department. If the team had more staff from each department, the team would become bigger and better. One of team members who is in charge of Internet banking systems design believes that the way that team members come from all related departments is good but the number and size of the Internet banking development team is too small. She comments

> *In terms of teams, teams need to be bigger; each unit needs more staff, and more involvement from more units. We need more manpower and resources. I believe that when we come to the right direction, there is work to be done, but there is less staff to work on the projects.*
>
> *(IBDT 01/Q11.1)*

During the action research, the team had limited human resources, but worked in a good direction and with effective action plans. One critical problem emerged which was the limitation of manpower to develop new features and functions, maintain the existing systems, and implement action plans. The systems designer frankly admits that she knows that all work needs to be done and all the work allocated to her responsibility. She does not have sufficient staff to finish a heavy workload. The amount of work is far beyond her capability.

> *Some problems are known for a long time, but we have not much manpower to deal with the problem. There is a limitation for manpower. There is a work overload; for example, 10 jobs for one member to finish in 2 months. It is impossible to achieve. Even though, I know that it is*

> *my job and responsibility to solve the problems, the capacity is insufficient.*
>
> *(IBDT 01/Q2.2)*

She knows and admits that the delay on her completion will affect the rest of the Internet banking maintenance and modification and improvement. This limitation creates enormous pressure on her and she confronts a high level of stress and pressure.

> *I felt that the nature of work is OK for me in general to develop Internet banking services. I need a large number of people to help me to develop the services. In the fact or in reality, as you see there are not many people who work on this project.*
>
> *(IBDT 01/Q2.2)*

Unfortunately, when the researcher revisited the research site and team members, two of the team members had resigned and moved to other commercial banks. The researcher asked one member the reasons for her resignation. She simply replied that during in the course of her work in the Internet banking maintenance and modification process, she had strong feelings and high pressure on her because the majority of the assigned works belonged to her and she faced some human resource and time constraints. There was too much work to complete and all assigned tasks are predecessor type of work.

> *In my case, apart from planning features and functions and web structure of Internet banking, I also have to create each page by myself. It is overload for one person to do all tasks. I felt sick just to do the plan and structure. The follow up tasks and consequent tasks also belongs to me again. I do end-to-end process. It is a one man show which is too much for me. If I have staff to help me, I am more than happy to work with the bank.*
>
> *(IBDT 01/Q2.2)*

It is clear that human resources are one of the significant factors for determining the success of the Internet banking development project. However, human resource is not the only issue that management has to pay attention to. The other critical issue is time allocated for the project.

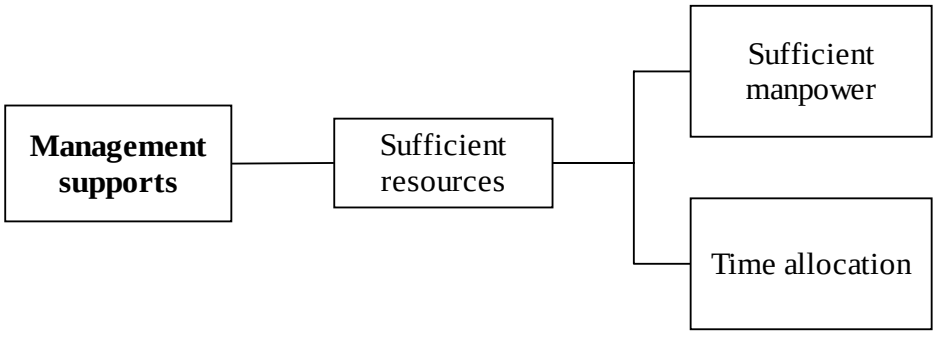
Time allocation is the other critical issue for Internet banking maintenance and modification. Team members need a certain amount of time when they are allowed to work on a special project apart from routine work. The Internet banking maintenance and modification team leader admits that the ideal option is that team members have time allocated to perform and concentrate on a special project like the Internet banking development process improvement project. In fact, all team members had plenty of their routine tasks to perform. Team members hardly had time to come for team meetings. It takes a long time to gather all team members together to attend a team meeting. Internet team leader gives an opinion that:

> *We need more team members, not just four - five members. The bank should dedicate time and resource if it needs more significant improvement. Meeting schedules take a long time to get all members free to join the meeting. If people just concentrate on only IB improvement and not include their routine work, it would be better.*
>
> *(IBDT 04/Q11.1)*

This pressure is because all the related departments do not have enough manpower to perform their routine work and they are busy and fully occupied with day by day work. They hardly have time to attend group meetings. Delay of group meetings causes delays in action plan implementations.

Figure 5.9:

Summary model of sufficient resources theme



5.4.4: Management needs to establish key performance index (KPI)

Management needs to set a target of achievement or Key Performance Index (KPI). Key Performance Index is an annual target of achievement that an individual department has to accomplish. The key performance index is established in order to demonstrate the scope of departmental short-term plans within a 1 year period. The promotion, salary increase or pay rise of individual departmental staff will then be determined and evaluated by actual performance based on the key performance index. Key performance index is also used as a motivation technique, identification for scope of objectives, a guideline for direction for future improvement, and evaluation measurement of departmental performance. One proposition emerges from the data which supports this theme. The proposition is:

- 5.6.4.1: Coherence and contradiction in KPI need to be managed.

5.4.4.1: Coherence and Contradiction in KPI need to be managed

The team leader who has responsibility for job evaluation for all related departments regarding Internet banking maintenance and modification shares his own experience regarding the objective of utilizing a key performance index. He explains and emphasizes that

> *If you want a good outcome, you need to have a target and KPI for them to achieve. The performance needs to be assigned by the job evaluation person, payment increase will relate to performance based on KPI. So, apart from team commitment, we need KPI for them to achieve. People always work on target, trust me.*
>
> *(IBDT 04/Q4.4)*

Here is an example of the breaking down of key performance index for the IT support department.

> *I ask every department which relates to Internet banking to set a KPI, Key Performance Index. The annual objectives relate to Internet banking. For example, IT support may set availability rate, operation may set Service Level Agreement, SLA, when customers register how many days before customers will receive their ID*

and password. All departments need to set a KPI that relates to Internet banking performance. So everyone will have ownership of their work responsibility.

(IBDT04/Q4.2)

However, the usage of a key performance index generated both positive and negative results. The positive result of using KPI is departments have achieved targets and followed the key performance index as a guideline for performance evaluation. The negative or side effect of key performance index is the contradictions of key performance indexes, especially in the situation of one key performance index affecting many departments. Different departments have different objectives, and in some cases they do not support other departments' objectives.

In the case of coherent or supportive key performance indexes, this happens when two or more than two departments share the same benefits of achieving implemented action plans. This coherent key performance index promotes a high level of a sense of ownership for the action plan implemented. The team leader illustrates how the coherent key performance index works.

For example, for call center and customer service, reduction in complaint calls is a departmental KPI, if we can develop better service, the customers feel more happy and the call center has less complaints; therefore, the call center will add more input to the team in order to help solve the customers' problems. If everyone has the same benefits, they will share the same objective.

(IBDT 01/Q4.8)

There is evidence to show how a key performance index contributes to team commitment. One team member comments

Team commitment and team orientation are not the key influences for team performance; the key influence is KPI, the benefit from doing the work. They will not try hard, if there are no related benefits or share in the same benefits. At the most they will provide some input but will not try hard.

(IBDT 01/Q4.8)

However, there is an interesting comment from the web designer; she gives further comment toward coherent key performance index, noting

> *It needs to be seen to whom that responsibility belongs. For example, if there is only my KPI and which does not belong to IT support's KPI, I need to beg IT support to do the work. If there is a shared KPI, we do it together. If it is my KPI and the target is involved with the call center or customer service, customer service may do us favors and I help you in that sense.*
>
> *(IBDT 01/Q4.7)*

It is interesting to see that the shared key performance index contributes to the Internet banking system development process. This implies that management need to manage and establish shared key performance indications in order to encourage cooperation between entire related departments.

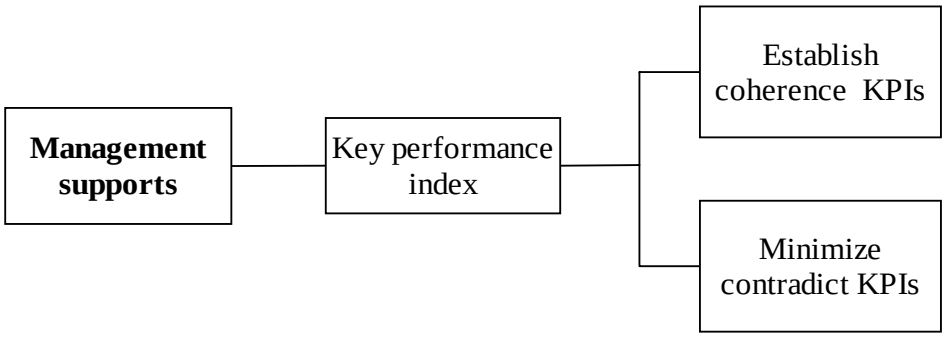
The coherent key performance index promotes shared responsibility, teamwork, and team participation. A key performance index also creates a side effect in the case of there being more than two departments involved for achieving the same target. One of the team members points out one important question for key performance index. She posits that "*the bottom line is "the same KPI." Do we have the same "KPI"? The team will have the same objective for sure when team members share the same KPI"* (IBDT 01/Q4.7).

However, there is a situation where the achievement of implemented action plans provided a benefit to one department and generated problems and difficulties for another department. This situation can not be avoided in the Internet banking maintenance and modification process. One team member identifies and explains how key performance indices can contradict each other. She explains

> *. . . for example, the programmer or IT support person who has a direct benefit for achieving the target, but both KPI go in different directions; for example, my KPI is to increase the number of Internet banking users, while IT support want to reduce the systems errors. In case of increasing numbers of users, IT's KPI will reduce because more users use the systems, there will be more problems or low systems performance. It is a related target but we have different points of view.*
>
> *(IBDT 01/Q4.8)*

There are many departments involved in Internet banking maintenance and modification. The main objective is to enhance the service quality and increase the number of Internet banking users and transactions. All related departments work toward the main objectives. However, the outcomes and results of implemented action plans generate both benefits and negatives. This is an issue that the team leader and management have to pay attention to and compromise on to avoid all conflict situations.

Figure 5.10:
Summary model of key performance index theme



5.5 Summary

This chapter comprises two main parts; the first part covers the data analysis procedure from data collection to data display. Then the next part presents the rich data or research evidence that supports research themes and categories. There are four main research categories which come from the four interventional change techniques within this research. The first two categories seem to play significant roles in Internet banking maintenance and modification process improvement. The later two categories have relatively less impact on Internet banking maintenance and modification process improvement. However, these four techniques are significantly important in the improvement process of the Internet banking maintenance and modification process. The next chapter will discuss the links between the research findings and the existing literature in order to see whether the research findings are supported by the existing literature or contradict the previous research.

Chapter 6 Discussion

The main focus of this study is the Internet banking maintenance and modification improvement process and the main objective is to investigate how this process can be improved and how well the interventional change techniques performance assisted process improvement. These areas will be discussed in this chapter. Section 6.1 will discuss and explain how the Internet banking systems development team achieved Internet banking maintenance and modification process improvement. Section 6.2 will discuss and explain how each intervention technique contributed to the Internet banking maintenance and modification process improvement.

6.1. Answering central research question

Within this section, the researcher will answer the central research question by explaining how interventional change techniques assist the Internet banking systems development team to achieve Internet banking maintenance and modification process improvement. The central research question is:

> Can interventional change techniques assist cross-functional multilevel teams to achieve Internet banking maintenance and modification process improvement, improve team performance, and increase the speed of the Internet banking maintenance and modification process?

From the research findings, this research revealed that the cross-functional multilevel team received significant benefits from the implementation of the four interventional change techniques tested within this research to achieve Internet banking maintenance and modification process improvement in a Thai organizational context. There was significant change and improvement in Internet banking maintenance and modification process improvement.

In order to achieve Internet banking maintenance and modification process improvement, the Internet banking systems development team needed to make two changes. These were that:

- there was a need for interventional change techniques; and

- there was a need for structured problem-solving.

6.1.1 Interventional change techniques

For creating process improvement in Internet banking systems development modification and maintenance, the researcher introduced and implemented four interventional change techniques.

The main objectives for implementing these interventional change techniques were to create departmental participation, promote equal participation, establish a cross-functional team, encourage a high level of participation, change the Internet banking systems development operational process, establish effective communication channels, and create an environment of change process.

The interventional change techniques were expected to generate four significant contributions for the Internet banking maintenance and modification process improvement. The four main contributions were:

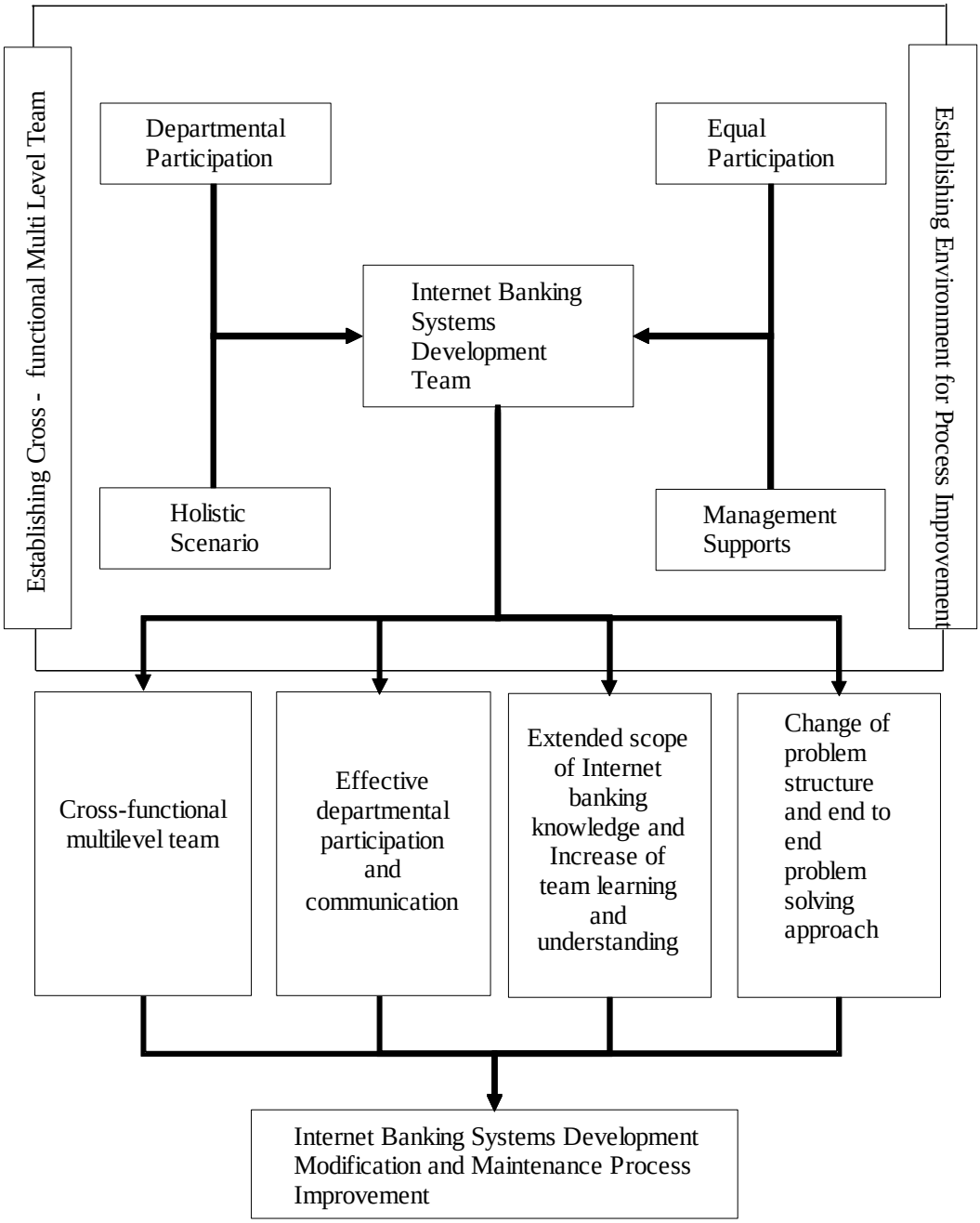
- Cross-functional multilevel team;
- Effective departmental participation and communication;
- Extended scope of Internet banking knowledge and team learning and understanding; and
- Changed problem structures and end-to-end problem–solving.

The departmental participation technique established a cross-functional multilevel team. The departmental and equal participation techniques provided effective departmental participation, created communication channels, and provided great opportunity for team members to share their knowledge, expertise, information, and departmental problems. The holistic scenario technique encouraged team members to perceive a broad and complete view of Internet banking systems development. The collection of all the problems of Internet banking systems development allowed Internet banking systems development team to address and solve problems as a whole system. There was a significant change in problem structure, as all departmental problems were combined into the team's problems. As a result, the Internet banking

maintenance and modification process improvement was achieved. The model of Internet banking maintenance and modification process improvement is shown in Figure 6.1.

Figure 6.1:

Model of Internet banking maintenance and modification process improvement



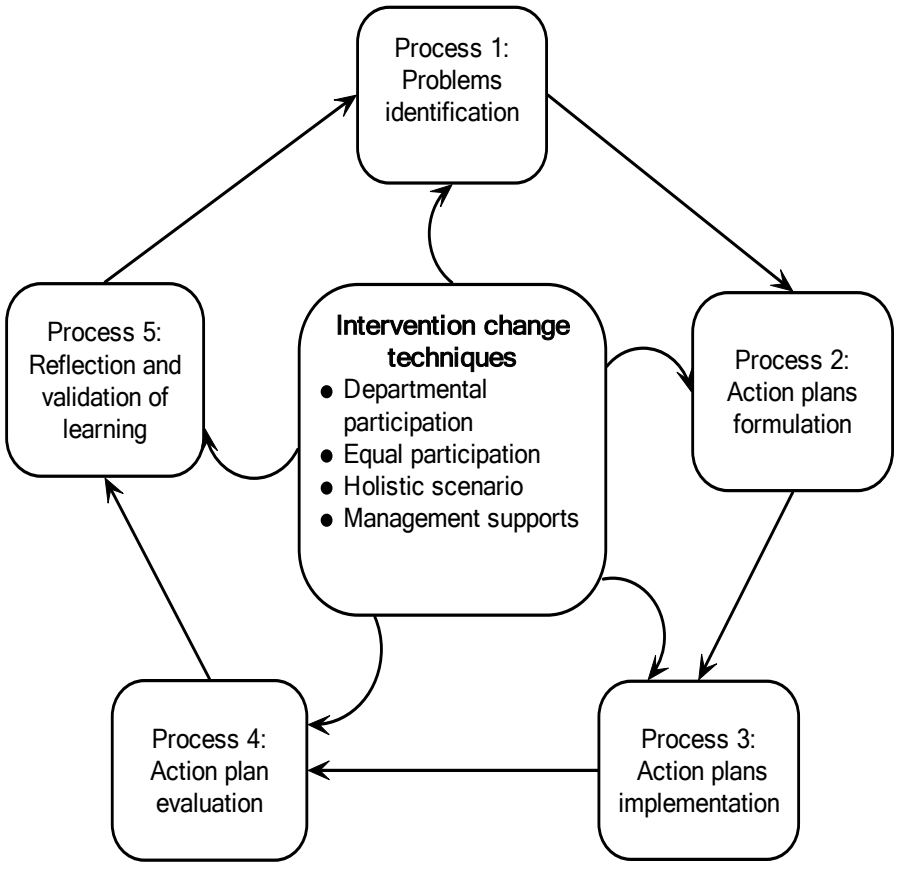
6.1.2 Structured problem-solving model

To create Internet banking maintenance and modification process improvement, there was a need to create change in the Internet banking maintenance and modification process. In order to achieve this change, the researcher adopted and adapted the original action research model created by Susman and Evered (1978).

This model comprises five processes for Internet banking systems development problem-solving and the interventional change techniques come in the middle. These two components have to work well together in order to create process improvement. The model of action research is shown in Figure 6.2.

Figure 6.2:

Structured problem-solving model



The model shows that there is a cyclic process in problem-solving and in the centre of the model are the four interventional change techniques which were introduced and

implemented during the Internet banking maintenance and modification process improvement project. The role of interventional change techniques is to stimulate and establish an environment of change within the Internet banking development team. The implementation of interventional change techniques will significantly change and have a direct effect on the process of Internet banking maintenance and modification in terms of the way the Internet banking development team members communicate, cooperate, and execute their action plans. In addition, the action research cyclic process of the structured model of Internet banking maintenance and modification problem-solving will provide a systematic approach for Internet banking systems problem-solving. The cyclic model helps the development team solve Internet banking problems more accurately and effectively while the interventional change techniques assist team members to change the operation of Internet banking systems development. The next section will provide more detail regarding the structured model of Internet banking maintenance and modification problem-solving.

This model provides a structured process of problem-solving for Internet banking maintenance and modification. There are five main predecessor processes from the problem identification process, action plan formulation process, action plan implementation process, action plan evaluation process, and reflection and validation of learning. The problem identification process is located at the top left hand side of the model, and then the final version of the factor model will be used as the data for action plan formulations which are connected to the last step of the problem identification process. The action plans will be formulated and go through the internal steps of the action plan formulation process. The final version of an action plan will progress into the action plan implementation process which is located at the bottom of the model. The action plans will be implemented based on their priority and timeline. Once action plans are implemented, next comes the evaluation process. Within the evaluation process, two sources of data will be measured: previous statistical data and customer feedback. The final process is located at the top right corner of the model which is the reflection and validation of learning process. The structured model for the Internet banking maintenance and modification problem-solving model is shown in Figure 6.2.

The following section describes and explains how each process contributes toward Internet banking maintenance and modification process improvement. There are several significant contributions from the cyclic process of Internet banking maintenance and modification. The discussion will move through the problem identification process to the reflection and validations of learning process. The full details of the five processes of structured problem-solving are presented in Figure 6.3.

6.1.2.1 Problem identification process

The highlight for this process is the introduction of the factor model. The factor model is utilized as one of the group activities. The interventional change techniques allow the team members of the Internet banking maintenance and modification team to meet and to cooperate with each other. The factor model is the accumulated problems regarding Internet banking adoptions and problems, based on the entire Internet banking maintenance and modification team. The problems are accumulated from team members' work experiences from their areas which creates a good opportunity for team members to realize and understand the broader scope of Internet banking system problems, not only their own area but the entire area of Internet banking systems: problems from marketing, information technology support, customer services, and website development. This holistic view of problems assists team members to understand the whole system of Internet banking development. The factor model is achieved by the combination of three interventional change techniques: departmental participation, equal participation, and a holistic scenario approach. This is the first part of the structured model of Internet banking maintenance and modification problem-solving.

6.1.2.2 Action plan formulation

In the factor model, the accumulated problems from the entire Internet banking development departments are combined and an overview of all the problems is presented. This creates a great opportunity for the Internet banking team to formulate end-to-end problem-solving action plans. Each team member represents his or her department, and team members formulate action plans to solve the problems that are

identified in the factor model. All the problems are not only addressed at the same time by the entire Internet banking development team, but also united into a grand action plan (Internet banking team action plan). This is a complete action plan. The other significant benefit from accumulated action plans is that the same problems are analyzed and addressed by a group of experts from the development team. Team members use their experience and expertise to evaluate the problems and formulate the solutions for the factor model. This advantage promotes effectiveness, efficiency and accuracy of action plan formulation. All action plans are combined and viewed by team members; therefore, there is less opportunity for action plans to contradict to each other. The equal participation technique allows team members to discuss and present their ideas, opinions, and arguments. There is a consensus among team members regarding action plans. Action plans become team action plans rather than departmental action plans. Team members have a sense of ownership of problems and action plans.

6.1.2.3 Action plan formulation

Action plans are evaluated and approved by team members. Three activities are used during action plan implementation. These activities are categorization, prioritization, and timeline. The process allows all action plans to be categorized and prioritized, based on their categories and priorities. The action plan timeline will assist team members to realize the sequence or predecessor of action plans and keep track of the progress of action plan implementation. This timeline assists team members to manage Internet banking maintenance and modification process improvement more effectively and efficiently.

6.1.2.4 Action plan evaluation

This evaluation process is designed for triangulation from two sources of data. In order to measure how well the action plans perform, the Internet banking development team needs both subjective and objective measurement parameters. The subjective parameter comes from the bank's customers who have a direct effect on the Internet banking system usage. Bank customers' feedback will reflect on how well the implemented action plans perform. The improvement of Internet banking

systems performance will be recognized and identified by Internet banking customers. The other subjective parameter will be received from the Internet banking team. The feedback and reflection of Internet banking maintenance and modification team members regarding action plan formulation and implementation will reflect on how well problems are addressed. In terms of the objective parameter, this comes from the collection of previous Internet banking performance statistical data. The statistical data reflects the performance of previous Internet banking systems which includes statistic data like system errors, customer complaints, Internet banking transactions, Internet banking users, and so on. The comparison between the previous statistical data and the current data will provide the opportunity for identification of Internet banking system improvement. The final step of the evaluation process is the triangulation between two data sources. This evaluation process provides an accurate process for action plan evaluation.

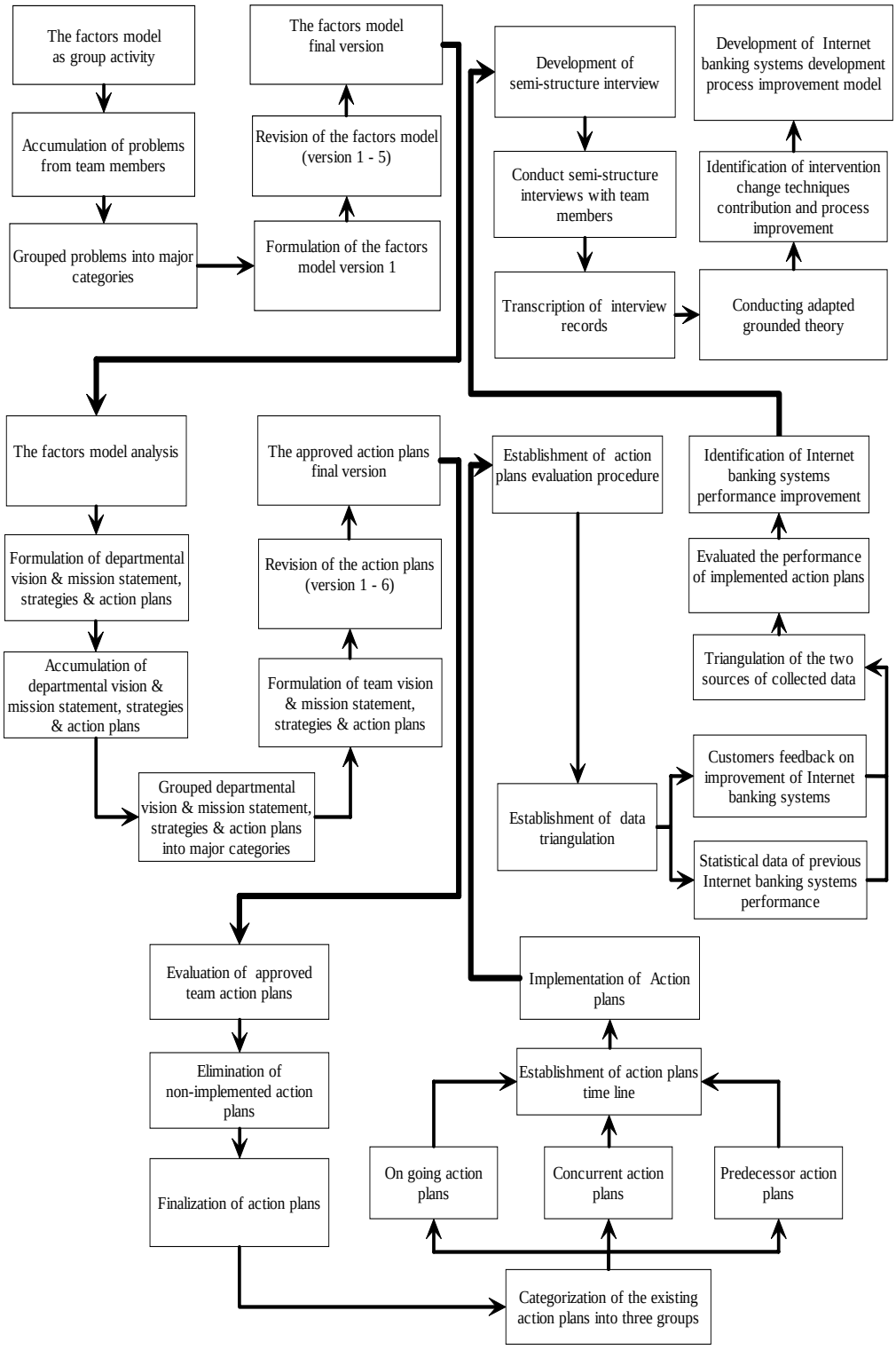
6.1.2.5 Reflection and validation of learning

This process is designed for identifying the learning experience from the implemented action plans. The reflection and validation of learning will be used as the input for the next cycle of the Internet banking maintenance and modification process for further Internet banking systems and services improvement. However, for this research, the researcher takes an opportunity to reflect on the Internet banking maintenance and modification process improvement and the impact of interventional change techniques on process improvement. The reflection and validation of the learning process adopted the interview with semistructured questionnaires as a data collection tool and applied grounded theory to identify the learning experiences or research outcomes from the process.

In general, the structured model for Internet banking maintenance and modification problem-solving provided unique group activities and a systematic process which can be followed and replicated effortlessly. This model works well for this Internet banking maintenance and modification team. The flow and more detail of the action research phase for structured problem-solving are shown in Figure 6.3.

Figure 6.3:

Five process of structure problem-solving model for Internet banking systems development problem-solving



6.2 Answering research subquestions

There are four research subquestions. These questions report and discuss the impact of the four interventional change techniques on the Internet banking maintenance and modification process improvement. The four interventional change techniques contribute differently and unevenly. The departmental participation technique, holistic scenario, and management support seem to generate the highest contributions and impacts on the Internet banking maintenance and modification process improvement, while equal participation techniques contribute less than the other three techniques. The following sections discuss the impact of the four techniques based on research findings, and the researcher's experiences as team member and observer.

6.2.1 How well does departmental participation technique work?

The researcher's observation and participation during the action research indicate that the implementation of departmental participation technique generated several significant contributions. There were four noticeable contributions: the communication and relationship between related departments, the level of expertise within the Internet banking development team, the structure of Internet banking problems, and collaboration of team members. These four main contributions prove that there has been significant change in the Internet banking systems development process, and that effectiveness and improvements have occurred. Therefore, the researcher believes that departmental participation did work well and created an effective Internet banking systems development process. The summary model for contributions of departmental participation technique is shown in Figure 6.4.

6.2.1.1 Good communication and relationships

The research findings of this study proved that departmental participation improves and promotes communication among departments. There is a communication channel for all related departments to communicate, discuss, and exchange ideas regarding Internet banking systems development after departmental participation technique is implemented because a cross-functional multilevel team has been established. In the previous process, all related departments communicated via the VP from the marketing department. There was no opportunity for all related departments to communicate directly. Departmental participation supports effective

Internet banking systems development because departmental participation promotes good relationships and communication among team members. Departmental participation allows all related departments to meet and communicate with each other. It provides an effective communication channel for team members to discuss and communicate on Internet banking systems development process and problems. Williams (1996) argues that teams need more sophisticated communication structure than other groups because teams need to exchange information, make decisions, develop openness, and build relationships among team members. Departmental participation created a great communication channel which was not available within the previous Internet banking systems development process. The richness of communication and information exchange among team members encourages mature communication. Therefore, team members have an ability to produce effective teamwork. Ruiz-Ulloa and Adams (2004) argue that there is a positive relationship between the characteristic of effective teamwork and attitude toward teamwork and development of mature communication. Within the Internet banking systems development team, because there is departmental communication, there is an improvement in discussion and decision-making quality. All related departments communicate with each other when they attend group meetings and discussions. Paulsen (1994) claims that greater teamwork within and between departments improves organizational and departmental communication and improves solution- and decision-making. Departmental participation eliminates the lack of communication between related departments. Goodman et al. (1986) claim that if there is infrequent communication, this situation creates short supply of important information, which leads to low performance. Mohamed et al. (2004) discover that when communication collapsed and employees' morale decreased, organizations become ineffective, incompetent and in a situation of confusion.

Good communication between departments promoted good relationships between departments. These relationships had a direct influence on the level of success of Internet banking systems development. Song and Thieme (2006) reported that the better relationship when departments worked together created more marketing involvement in traditional R&D activities. These factors contributed to the success of new product development. Loo (2003) showed that interpersonal relationships among team members, enthusiasm about their project, and expectation of quality project work are supportive and positive in a team climate and a good team climate is an important factor to promote team effectiveness. Huang and Newell (2003) argued that the

collective sense of belongingness reduced the conflict between departments. Therefore, because there was an effective communication channel within the Internet banking development team, there was the likelihood for team members to create an effective performance in the Internet banking systems development process.

6.2.1.2 Diversity of expertise

This study found that the departmental participation technique generated a diversity of expertise among team members because a cross-functional multilevel team was established and team members represented their department. Each individual team member was an expert in his or her area. Wellins et al. (1994) stated that cross-functional teams combined members representing various departments or functions. During the action research process, team members worked well and overcame some major Internet banking problems. The possible explanation was Internet banking team members shared their experience, knowledge and skills with the other team members. This situation echoes Hackman and Powell (2004) who argued that a team needed diversity of knowledge, skills, perspectives and experience. A team did not gain full benefit for being a team if all its members were the same, whether demographically or in terms of their knowledge base or skills. It was the diversity of knowledge, skills, perspective and experience that was so important. Eriksen and Beauvais (2000) also supported the concept that team composition in which individuals had heterogeneous schemata possessed greater potential creativity than individuals with homogeneous schemata. Team diversity created and increased innovation and creativity in team decision-making and problem-solving. Team functional diversity referred to the number of functional areas represented on the team.

The other explanation for increased team performance during the action research process was the level of skills within the Internet banking systems development team. The results from data analysis showed that there was a complete skill set for performing Internet banking tasks. The complete skills within the Internet banking team came from the establishment of a cross-functional team or departmental participation. Katzenbach and Smith (1993) agreed that a team was a group of people with complementary skills who were chosen to achieve a common goal and were mutually accountable for the team's success. Katzenbach and Smith (1993) added and explained further that teams needed various skills; in essence, teams became more productive when members had different skills and attributes. Individual team members had opportunities to

develop and increase their technical or functional expertise, and their problem-solving, decision-making, and interpersonal skills. In addition, Huang and Newell (2003) believed that cross-functional teams had members with highly differentiated knowledge and the integration of differentiated knowledge directly promoted team effectiveness.

Internet banking development team effectiveness also demonstrated speed of decision-making and lifecycle of Internet banking problem-solving. From the findings, a cross-functional team was found to be the most influential factor for speed of decision-making and problem-solving. Team members admitted that when the Internet banking development team was established, all decisions were reached and problems were solved more effectively and efficiently. This result was similar to the findings of Karagozoglu and Brown (1993) and Sethi et al. (2001). These authors argued that a highly diverse team decreased the development cycle time by increasing goal congruence among the functional team, bringing high creativities to problem-solving, and ensuring the availability of significant inputs. Mohamed et al. (2004) also stated that the combination of collegial relations, personal competence, multiskills, tacit knowledge, diversity and technology assisted the creation of brainpower for organizations, as a result, connecting organization units together, achieving competence gains and productivity enhancement. More recently, a study by Carbonell and Rodriguez (2006) also confirmed that functional diversity had a greater positive impact on the speed of technological complex products. This was because at a high level of functional diversity, the increase of functional diversity had positive impact on speed of innovation. The more complex and difficult the project, the more the project needed significant functional interdependence to speed up its execution. Another study also supported this, finding that integrative teamwork created a 100 % solution and synergistic teamwork created in excess of a 100 % solution; in contrast dictated teamwork generated 20-50 % solution and compromising achieved 33.3 % solution. Integrative teamwork achieved 100 % solution by pooling the team members' expertise, and synergistic teamwork achieved in excess of 100 % because team members created new solutions (Nurmi, 1996).

The cross-functional team created diversity of expertise and the Internet banking development team had complete skills and knowledge to perform Internet banking tasks, reach effective decisions, and increase the speed of the Internet banking systems development. It was clear that

cross-functional team and departmental participation techniques had positive impact on team performance.

6.2.1.3 Changed problems structure

There was an interesting result from the implementation of departmental participation. The departmental participation created a cross-functional team. Team members came from different departments and they not only brought their expertise, skills, and knowledge to the team but also their departmental problems. Previously departments solved their own problems based on assigned tasks from the vice-president. Once the cross-functional team was formed, team members came to work as the Internet banking development team. There was no boundary regarding departments. One of the reasons for implementing departmental participation was to provide an opportunity for team members to share their departmental problems with the other departments. The researcher expected to see shared problems among team members. Shared problems were achieved by the introduction of the factor model. The factor model combined all problems and categorized them into major groups. Some tasks required cooperation from many departments. There was change in terms of problem structure from departmental problems to group problems. The group problems forced team members to take parts of the problem; problems belonged to Internet banking development team not departments. Therefore, team members supported and helped each other to solve the problems. This finding was supported by Quick's (1992) research. The author said that collaboration was the primary benefit, people wanted to work well together and support each other because they were identified as teams. This confirmed that departmental participation changed the problem structure and assisted team members to help each other in Internet banking development.

6.2.1.4 Team orientation

The findings of this study showed that departmental participation also promoted shared problems, responsibilities, and ownership. There was a transformation of organizational culture from individualistic to team orientation. Team members had shared their departmental problems with other team members and created team problems. Team problems created a sense of ownership and shared responsibility. Problems did not belong to a department but to the Internet banking development team. Team members took parts of the problems based on their expertise and functionality because there were many tasks that required many departments to solve them. This

finding was supported by Attaran and Nguyen (1999b, p. 335). They found that a team created change in organizational culture from an unstructured, individualistic, throw-it-over-the-wall attitude to a problem-solving and decision-making, and predominantly participative problem-solving and decision-making, culture. There was no one within the team who denied responsibilities. A certain level of commitment was created within the Internet banking development team. Quick (1992) noted that team members felt that they had a strong commitment to the team and did not want to let other team members down. Therefore, team members needed to be committed to performance goals. The small team size assisted team members to feel a sense of responsibility (Twomey & Kleiner, 1996). Klivimaki and Elovainio (1999) also found a shared commitment to teamwork, participative safety, high standards of performance, and systemic support for cooperation.

The results of this study also showed that departmental participation promoted shared ideas, directions, and objectives. At the end of the first meeting with team members, the researcher asked team members to share their vision, missions, and objectives with each other. The researcher combined and discussed these to create the team vision, mission, and objectives. Team members agreed and reached a consensus on team vision, mission, and objectives. For action plan formulations, team members ensured that all action plans supported, and were part of, the team's vision, mission, and objectives. There were clear vision, mission and objectives among team members. Anderson, Hardy, and West (1990) agreed that a mission statement needed to combine and articulate team members' personal beliefs and team members negotiated a mission statement with team consensus. Team members determined the team's direction and had clear direction.

Twomey and Kleiner (1996) found that not only was the right mix of skills required, teamwork also needed clear goals. More recent studies also demonstrate the importance of clear goals and understanding. Ruiz-Ulloa and Adams (2004) proposed that there was a positive relationship between the characteristic of effective teamwork and common purpose, and clear understanding. In addition, Wheelan (1999) and Varney (1990) also argued that a team had clear objectives which were understood by all team members. Team members were also committed to accomplishing team objectives. Team objectives were created through a process of participation and involvement. Quick (1992) pointed out that decisions were made by consensus. Team members agreed on decisions and solutions and consequently felt committed to carrying them out

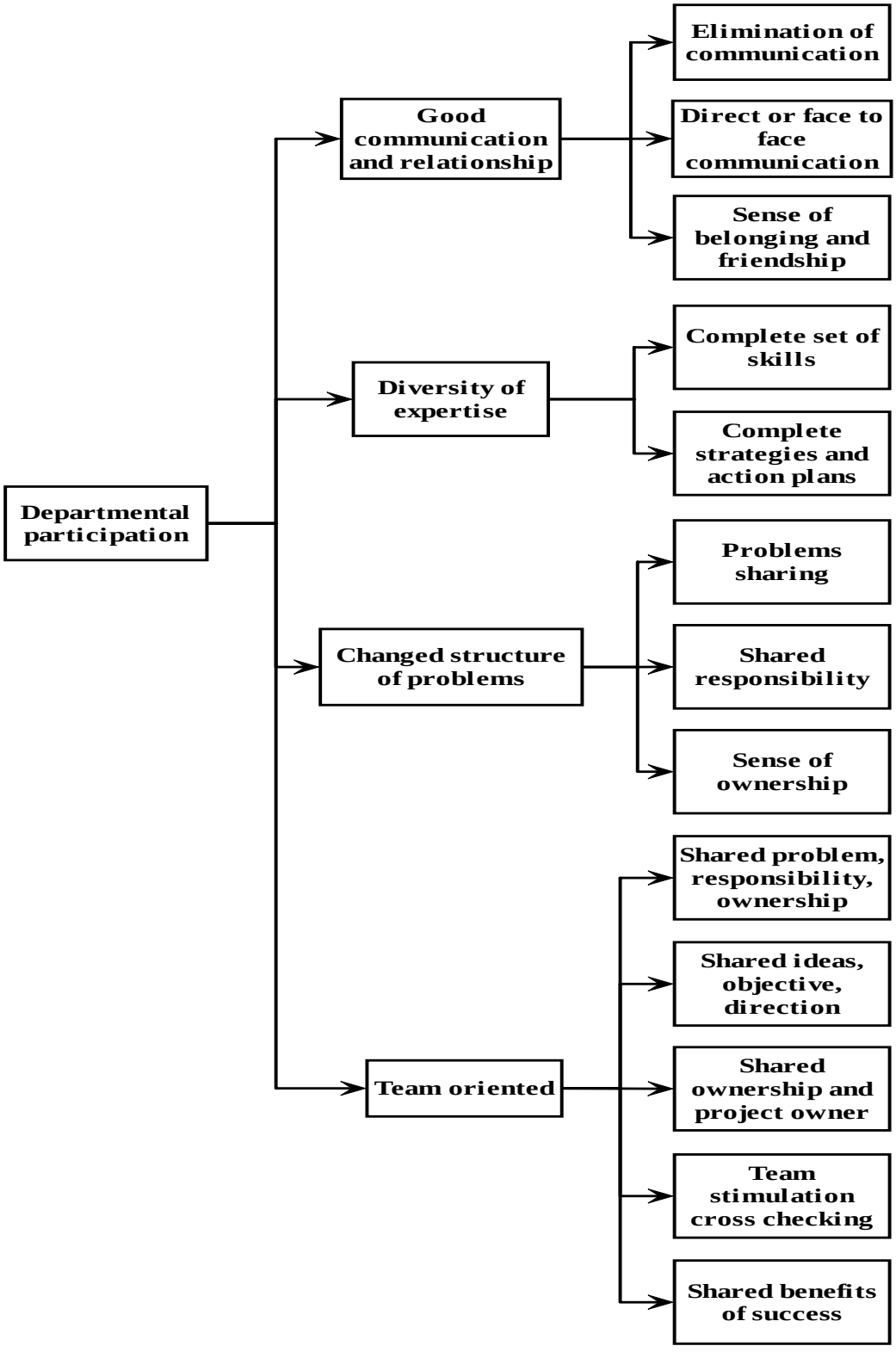
successfully. Wellins et al. (1991) recognized barriers to effective teamwork were lack of clear vision, goals, and objectives, and insufficient release time from other duties for team members. Drew and Coulson-Thomas (1996) presented some significant enabling factors for team effort. They found that clarity of goals and objectives was ranked at number one. Stewart et al.(1999) found that performance increased through the establishment of specific goals. A team needed clear direction which could be derived from communicated goals. Therefore, a goal was defined as something that a team attempted to achieve and accomplish, or the object of actions. Varney (1990) proposed that both individual and team goals had to be clearly defined and goals also needed to be established within the context or scope of the team's objectives and goals.

The results also showed a further benefit of shared problems and responsibilities was the creation of success sharing among team members. Internet banking development needed involvement from various departments. Problems might not be completely solved without team members' involvement. There was a certain level of job dependency within Internet banking development. Involvement and participation from team members was an influential ingredient for success. Williams (1996) noted high dependency in which the work of individual member was totally interlinked with the work of other members. Team members could not achieve the target unless the other members achieved theirs. This statement was supported by Stewart et al. (1999) who suggested that teams completed common tasks more quickly and effectively than when individuals worked alone. Huang and Newell (2003) also agreed that cross-functional teams enabled an organization to gather a wide range of expertise from various units to accomplish a complicated task which was not easily done by one unit.

Apart from helping each other, team members also had an opportunity to stimulate each other which was similar to the research finding of Quick (1992). Problem-solving occurred within the teamwork concept when decisions and solutions were made simultaneously with total involvement of team members.

Figure 6.4:

Category relationship diagram of departmental participation



6.2.2 How well does equal participation technique work?

The research findings revealed that the implementation of equal participation technique generated several significant contributions. The study confirmed that equal participation allowed team members to communicate freely and equally. This opportunity encouraged and allowed team members to share their knowledge, expertise, and information regarding Internet banking development. There are four substantial contributions, for example, the broad picture of Internet banking development, the extended knowledge of Internet banking, the effective action plans, and team learning and understanding. These four main contributions prove that there was significant change in the Internet banking systems development process; there are effectiveness and improvement in Internet banking development process. Therefore, the researcher believes that equal participation did work well and created an effective Internet banking systems development process. The summary model for contributions of departmental participation is shown in Figure 6.5.

6.2.2.1 Shared knowledge, expertise, experience, and information

The research findings of this study indicated that equal participation promoted an environment of shared knowledge, expertise, experience, and information. The culture of sharing information and knowledge between related departments assisted team members to perceive a broad view of Internet banking development. This finding was consistent with Anderson, Hardy, and West (1990). They suggested that support and information availability were significantly important; the team leader and members shared information and support for individual team member to achieve his or her task.

During the action research process, team members exchanged their information regarding their departmental operational process and departmental problems. Team members listed and gathered useful information from the other team members. This scenario created team learning and understanding regarding the entire Internet banking development process.

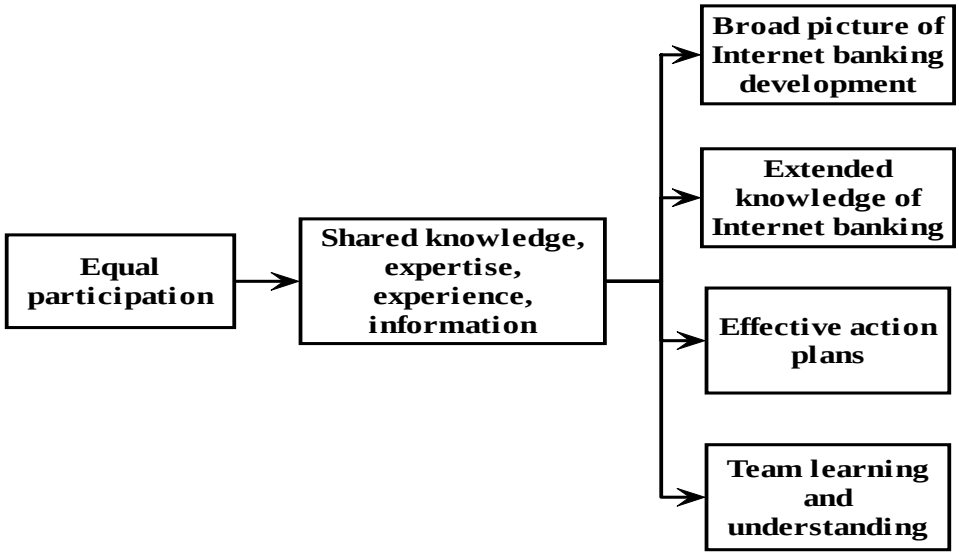
It was clear that equal participation was crucial for the cross-functional team to receive the full benefit of a team approach. Denison, Hart, and Kahn (1996) proposed that the challenge of cross-functional teams was the level of information exchange among team members. It confirmed that equal participation supported cross-function and allowed team members to share information.

This finding implied that equal participation supported and assisted a cross-functional team to become an effective team. Varney (1990) posited that there were high levels of listening, and sharing of information in an effective team. Equal participation not only encouraged team members to share information, equal participation also allowed information to move and flow freely. This result was consistent with Quick (1992). The author noted that communication was another crucial benefit; information flowed freely up and down and also sideways, because team members realized how important it is to pass on information; therefore, team members had the chance to operate more efficiently. Song and Thieme (2006) found that a cross-functional team minimized the information gap. The importance of information-sharing between R&D and the marketing department was the way to reduce uncertainty in the highly volatile environment of new product development and minimized the participation gap which assisted marketing to become involved in traditional R&D activities.

The other main benefit of equal participation was extended knowledge of Internet banking systems development. The research found that team members shared their knowledge, experience, and information during the group meetings. The culture of sharing useful information between team members facilitated team members' learning experience. Team members knew and understood the whole Internet banking operational process. This finding was similar to that of McGinnis and Kemp (1998). They found if communication between departments was facilitated, organizational knowledge and skills were strengthened and expanded, and that team members learnt more about the other members' work and the whole organizational operation. The information sharing created extended knowledge of Internet banking which assisted team members to formulate effective action plans and achieved Internet banking systems development modification

and maintenance. The Internet banking development team was able to formulate effective strategies and action plans because they improved their decision-making process and speed of decision-making. This result was similar to that of Bamber, Castka, Sharp, and Motara (2003). They found that cross-functional teams combined all necessary skills and knowledge of the entire system of manufacture in order to correctly identify the practices. All action plans were developed during the team meeting to gain the best utilization of operational and other resources by using the authority and responsibility of team members who represented various departments and functions within organizations. Huang and Newell (2003) also found that a cross-functional team enhanced the quality of decision-making by having multiple perspectives.

Figure 6.5:
Category relationship diagram of equal participation



6.2.3 How well does holistic scenario technique work?

The results of the action research indicated that the implementation of the holistic scenario technique generated several significant contributions. Team members had an opportunity to perceive the entire problem of the Internet banking maintenance and modification phase. The problems were categorized into major groups and there was an

elimination of floating problems. In addition, all problems were transformed from single problems into groups of problems. A systematic structure of problems was created. All problems were easily assigned the project owners. In addition, problems were solved all together as the whole systems. There were no side effects from the implemented action plans because team members perceived the potential problems during the planning stages. As a result, the number of errors decreased. Therefore, the researcher believes that holistic scenario did work well and created an effective Internet banking systems development process. The summary model for the contributions of the holistic scenario technique is shown in Figure 6.6.

6.2.3.1 Factor model

The research findings indicated and confirmed that the usage of the factor model as a problem identification group activity assisted team members to combine all Internet banking problems into one complete and structured problems model. This structured problem model allowed team members to realize and perceive a complete view of problems in Internet banking development.

All unattained, floating, and departmental problems were added into the factor model. Team members brought their department problems to share with team members and add into the factor model. The factor model acted as a database of Internet banking problems. There were no departmental problems any more because all problems were combined and grouped into six main groups.

The factor model helped team members to address and formulate action plans effectively. This research finding was consistent with Varney (1990). The clear and accurate problem identification was a key fundamental to improve teamwork and a comprehensive definition of team problems required team members' contributions because team members were the people who were able to articulate and clarify information and problems through their work experience (Varney, 1990). The factor model combined all problems that were identified by team members, based on their work experiences. The factor model version 5 is shown in Appendix A5.

6.2.3.2 Categorized and prioritized problems

The holistic scenario allowed the Internet banking development team to perceive the complete picture of Internet banking systems' problems. Once all problems were gathered and combined, all problems were categorized into main groups. There were six main groups in the factor model version 5. The six main groups were trust, applications, marketing, systems, Internet, and culture. All floating or unattained problems were added or assigned into one of six major groups. Problems within each group were prioritized based on their critical level. This prioritization and categorization of problems allowed team members to create systematic and structured Internet banking problems. In addition, the prioritization and categorization of problems also generated two additional contributions which were project owner of problems and effective action plans. The first contribution of systematic structured problems was the ability to assign problems to project owners. All problems needed project owners and, in some problems, problems needed more than a single department to solve them. Some problems needed cooperation among related departments. The second contribution was that systematic structured problems allowed team members to prioritize all problems into critical problems, intermediate problems, and subtle problems. Within the major groups, all problems were prioritized based on emergency level. The critical problems were addressed and immediate action was taken. The categorization and prioritization of problems allowed team members to formulate effective action plans to handle the critical Internet banking problems effectively and efficiently.

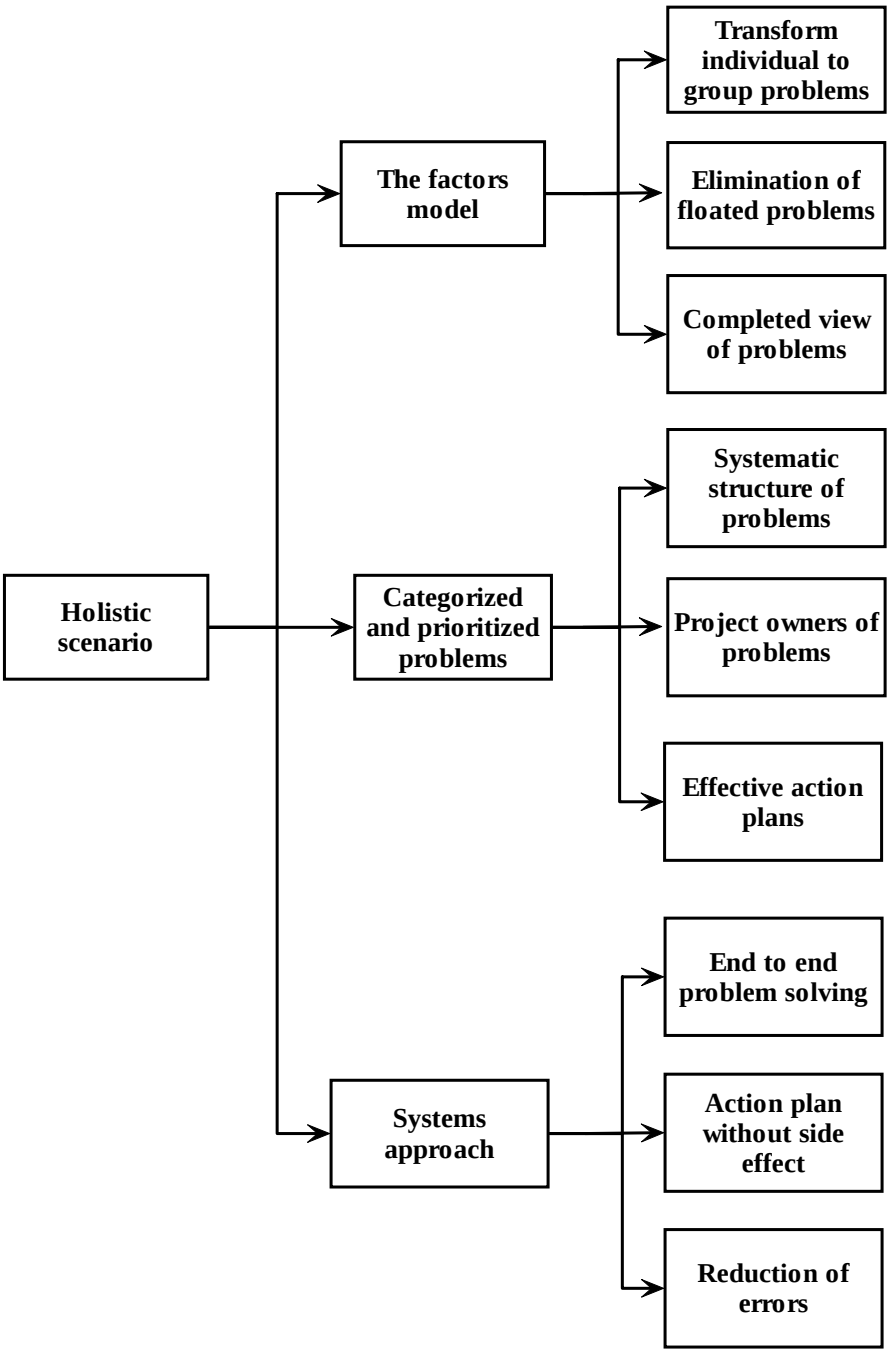
6.2.3.3 Systems approach

The other significant contribution of the holistic scenario was that all critical problems from six groups were handled and addressed at the same time. In previous Internet banking problem-solving, all individual problems from particular departments were solved based on departmental strategies and action plans. Many overlapping problems were left and not completely solved. The systems approach to problem-solving allowed all critical problems to be solved all together at the same time. It was an end-to-end problem-solving solution. All Internet banking problems were solved for the whole system. This systems approach has definitely lifted the performance of Internet banking

problem-solving. All action plans were supported and were not contradicted or interrupted by others. There were no side effects from the implemented action plans; as a result, the number of errors was reduced.

Figure 6.6:

Category relationship diagram of holistic scenario



6.2.4 How well does management support technique work?

The research results confirmed that the implementation of the management support technique generated several significant contributions. There are four noticeable contributions: the change of leadership role, the encouragement for equal participation, the allocation of sufficient resource, and implementation of key performance indicators. These four main contributions proved to have an impact on the Internet banking systems development process. There was effectiveness and improvement in Internet banking development process. Therefore, the researcher believes that management support technique did work well and created an effective Internet banking systems development process. The summary model for contributions of the departmental participation technique is shown in Figure 6.7.

6.2.4.1 Changed leadership role and control

The research findings of this study proved that management support contributed to the change of leadership role because the Internet banking team leader was asked to play a supportive role for equal participation. Therefore, the team leader needed to change his role and level of control from overpowering leadership to empowered leadership (Stewart & Manz, 1995). The team leader needed to allow team members to design their own work process and determine their own strategic direction. From observation and participation, the researcher found that when the team leader was asked to be more supportive and provided management supports, the team leader had changed his role from leader to coach and facilitator. The team leader had less control over all directions and decision-making. There were more opportunities for team members to create their own decisions and directions. Team members clearly had more control of their work and decision-making. This change in leadership style and level of control diminished the team leader's absolute power. Team members had more authority over and accountability for their work. This finding was consistent with Proehl (1997) and Mohamed et al. (2004). Proehl suggested that a team needed to have both authority and accountability to accomplish its tasks. Mohamed et al. (2004) found from their research that middle managers were not willing to share their power.

Bringing people together was not sufficient; team members had to be empowered and offered an opportunity to manage or have self-management; team members needed sufficient information to investigate a problem, derive inference, find a solution, determine the risks, and plan for full implementation without fear of failing or making mistakes (Mohamed, Stankosky, & Murray, 2004). The possible reason for the team leader to empower team members was that empowerment allowed team members to have authority in decision-making and managing their work. Wilson (1996) confirmed that empowerment encouraged employees to participate actively in their decision-making process and allowed team members to achieve recognition, involvement, and a sense of ownership and ateam leader needed to give team members permission to be participative members, create opportunities for team members to express their thoughts, ideas, and opinions, and encourage team members to listen and give feedback to other team members. Yoon (2005) found the same result and agreed with Wilson (1996). Yoon posited that empowerment was assessed by the extent of autonomy and participation. Team members were empowered to make decisions for which they had appropriate knowledge, skills, attitudes, and information. It was clear from the research finding that as far as empowerment went, the team members were keen to have more autonomy and to become more involved in the decision-making process. The changed leadership role and level of control created an open-minded team leader. The team leader listened to his team members and allowed them to suggest, express, and present their ideas and opinions. This result confirmed the findings by Varney (1990). Varney said that, in an effective team, the boss was open to suggestions and encouraged free expression of ideas and opinions. He also found that, in an effective team, team members had a certain amount of control in performing their tasks. This finding was consistent with Wellins et al., (1991), who recognized a barrier to the effective teamwork was unwillingness to allow teams the necessary autonomy and decision-making powers.

Janz (1999) found that there was a positive relationship between the level of autonomy and effective work outcomes and perceptions of performance. She found that a self-directed team improved its satisfaction and motivation level when it had team autonomy.

6.2.4.2 Encourage equal participation

In addition to the change in leadership role and control, the team leader was asked to encourage equal participation. This equal participation created openness in discussion among team members. Proehl (1997) argued that because team members came from different functional areas, a team becomes a multicultural experience because members have different perspectives, vocabularies, and behaviors. Team members also established a culture of respect and open communication. The open communication was the key success factor for team effectiveness because high quality teamwork appeared to show that members openly communicated, coordinated their individual activities, ensured that team members contributed their knowledge at full potential, mutually supported each other during discussion, maintained a high level of effort, and encouraged team cohesion among team members (Hoegl & Gemuenden, 2001). Yoon (2005) argued that open communication enhances decision quality and reinforces team consensus and acceptance. Open communications were central to getting sincere involvement from team members. Open communications were assessed by the extent of open communications, communication between team leaders and team members, and shared information. Therefore, the openness, or open communications, was the influential factor in team effectiveness. The openness of communications also encouraged the willingness to participate because team members felt free to add ideas without being criticized. Trust replaced fear; creativity and risk-taking were encouraged, and members listened to each other (Attaran & Nguyen, 1999a).

6.2.4.3 Sufficient resources

The research finding indicated and confirmed that the management support played a significant role in Internet banking systems development. Aladwani (2001) and Mols (2001) found that top management support was important for developing an online banking website. Drew (1995b) found that lack of management support was a major barrier to new product development in financial institutes and Drew (1995a) claimed that the commitment of top management was the critical factor for speed of new services. This research finding is also supported by Lievens, Moenaert, and S'Jegers (1999) who found that strong commitment and support from management created a good quality of

project climate that supported the high degree of success for new service development. Zeithaml and Bitner (1997) argued that the lack of management support was cited as the source of problems in new service development.

The research finding from this study indicated that management support was crucial for the Internet banking development, maintenance, and modification phases. Team members needed to have time allocation, information sharing, and authority and autonomy to perform their work. This research result was confirmed by Proehl (1997), Twomey and Kleiner (1996), Wellins et al. (1991), and Drew and Coulson-Thomas (1996). These authors agreed that team members needed great support from management. Proehl (1997) noted that management support and adequate resources were significant factors for cross-functional team success. Wellins et al. (1991) and Drew and Coulson-Thomas (1996) found that lack of sufficient senior management support and commitment were recognized barriers to effective teamwork, and personal commitment and supporting management attitudes were significant enabling factors for team effort. The other significant factor of management support was manpower support. The research findings show that there were insufficient human resources in web design and development. There was a work overload for the web designer to handle. Therefore, there was a bottle neck for development and modification of the website interface. As a result, the web designer resigned from the bank and moved to work with another commercial bank. The web designer admitted that she did not mind a large amount of work, but she did not have enough time to handle all the work by herself. This research finding indicated that sufficient human resource was significantly important for the Internet banking development and maintenance phase. This finding was similar to Katzenbach and Smith (1993) who found that the work relationships between team members needed to be fair and equal. The workload and responsibility were supposed to be divided equally in order to achieve team goals and satisfy team members. The sincere promises of commitment and trust created and developed collective accountability among team members.

6.2.4.4 Key performance indicators (KPIs)

The key performance indicators technique was used as a guideline for all related departments to perform and was used as an evaluation indicator. During the action research, the researcher found that there were two types of KPIs which were coherence KPIs and contradictory KPIs. Kolb and Putnam (1992) argued that conflict existed when there were real or perceived differences that aroused the specific circumstances that endangered emotion as a consequence.

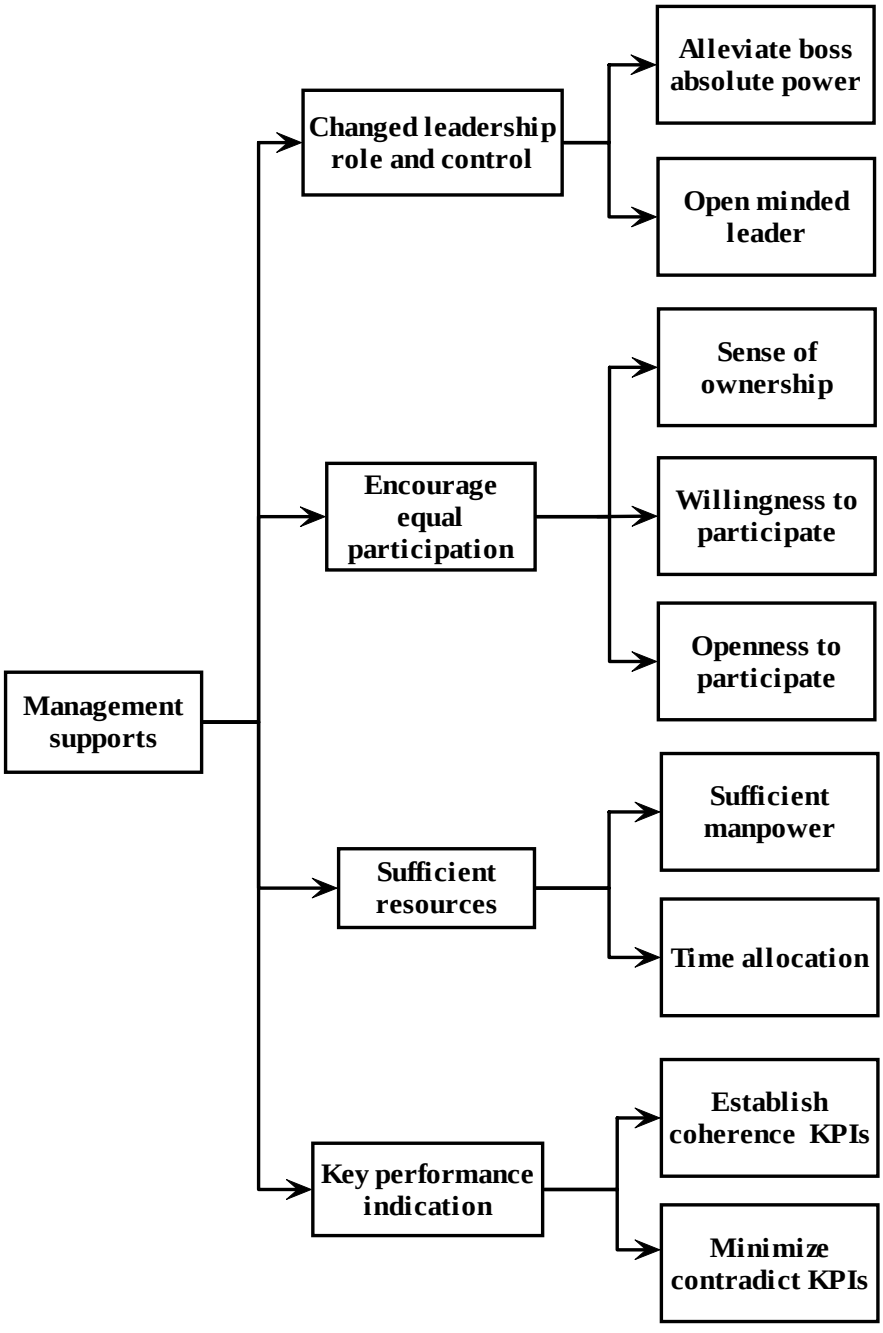
The research finding showed that the team leader needed to carefully manage the setting of KPIs. In the previous Internet banking systems development phase, all related departments had their own KPIs. There was a likelihood of having contradictory KPIs because different departments had different objectives and targets. One KPI of customer service and marketing was a high number of Internet banking users and transactions, whereas the KPIs of the IT department stressed the stablity and reliability of Internet banking systems. The high Internet banking demands and transactions caused systems errors and low quality of Internet banking systems. Sessa (1996) argued that conflict was a central element that allowed team decision effectiveness, if conflict was managed carefully and effectively. The challenge was how to create coherent KPIs among related departments. After the action research process, all related departments had shared objectives and targets. Every department focused and concentrated on the team KPIs. There were shared benefits among team members. This research finding was consistent with Jasswalla and Sashittal (1999) who suggested that there could be unshared and sometimes conflicting goals, and perceived differences in professional allegiance. Even though team members shared project goals, team members from different departments or functions tended to have different functional objectives, priorities, and agendas. McGinnis and Kemp (1998) also noted conflicts and dual loyalties when a member's department and the team had conflicting demands. The other potential problem was if a team focused on a decision that benefited their team rather than organization as a whole.

Therefore, the use of departmental participation and a cross-functional team was an effective solution for managing conflict between departments. This finding was

supported by Huang and Newell (2003) who argued that cross-functional teams had organization-wide representatives, which created a collective sense of belongingness which reduced the conflict between departments.

Figure 6.7:

Category relationship diagram of management support



6.3 Summary

From the research findings, there was evidence for the improvement of the Internet banking systems maintenance and modification phase. The four interventional change techniques contributed and assisted team members to maintain and enhance the Internet banking system and its services. There were significant changes within the Internet banking systems maintenance and modification phase. There was structural change in the Internet banking development team from departments to a cross-functional team. The establishment of a cross-functional team generated various significant contributions for the Internet banking systems development and maintenance phase. There were changes in the way that team members communicated with each other. Within the cross-functional Internet banking development team, team members were able to contact other members directly and there was two-way communication during group meetings and discussions. Team members had great opportunities to participate, communicate, discuss, and offer their opinions and ideas during group meetings. Team members came from different related departments, yet they had a great chance to know and build their relationships with others as team members. Friendship and companionship existed among team members. Therefore, team members communicated and participated effectively. In addition, team members also had an excellent opportunity to extend and expand Internet banking knowledge and the scope of their Internet banking development knowledge. Team members perceived entire viewpoints of the Internet banking development process and its problems. There was also change in the problem structure from departmental problems to group or team problems. These significant changes helped team members to perform an effective Internet banking systems maintenance and modification process and achieve Internet banking systems maintenance and modification process improvement.

Chapter 7 Conclusion

This chapter will present some key research contributions of this research and suggest some research implications for practitioners and researchers. The limitations of this thesis will be identified and opportunities for future research will be discussed.

7.1 Research contributions

In terms of research contributions, this research generated both organizational and academic contributions. The following section presents some of organizational and academic contributions.

7.1.1 Academic contributions

This research makes five major academic contributions to: the Internet banking systems maintenance and modification phase, the implementation of teamwork in Internet banking research, the diversity of the Internet banking research domain, the process improvement model for Internet banking, and the structured model for Internet banking problem-solving.

7.1.1.1 Internet banking systems maintenance and modification phase

As identified earlier in Chapter 1, the Internet banking research domain lacks research publications in the area of Internet banking systems development and the Internet banking systems maintenance and modification phase. This research fills this gap by investigating the Internet banking systems maintenance and modification phase. There is an intention to establish process improvement of this phase. This research contribution will extend the scope of the Internet banking research domain and add a new research topic.

7.1.1.2 Implementation of teamwork in Internet banking research

By investigating the Internet banking systems maintenance and modification phase of process improvement, the researcher introduces and uses the cross-functional team as the

working environment for anInternet banking systems maintenance and modification team. In the previous research publications, there is no article that has Internet banking systems maintenance and modification team members as the unit of analysis. This research study will be the first which brings the teamwork concept into the Internet banking research domain.

7.1.1.3 Diversity of Internet banking research domain

This research paper will add to the diversity of the Internet banking research domain in terms of perspective, method, topic, unit of analysis, data analysis, and geographic area. This research adopts qualitative research as the research paradigm, action research as its methodology, Internet banking systems maintenance and modification phase as its research topic, Internet banking systems maintenance and modification team as the unit of analysis, content analysis as data analysis, and Thailand as the geographic area. The literature reveals that the majority of articles adopt a quantitative research perspective and a descriptive research purpose. The bank customer is the number one target as a sample group. The factors affecting Internet banking adoption is the most popular research topic. Therefore, this research will add different dimensions and diversity to the Internet banking research domain.

7.1.1.4 Process improvement model for Internet banking

The research proposes and tests the model of process improvement for the Internet banking systems maintenance and modification phase. The introduction of interventional change techniques allowed the researcher to create a positive environment for change and process improvement. The four techniques work well within this research context and assist in creating a new working environment and group culture. The interventional change techniques manipulated team members' attitude during the research process. There have been several changes within the Internet banking systems maintenance and modification phase; for example, the ways team members communicate, cooperate, discuss, and participate generate effective team performance and team effectiveness. Interventional change techniques also guided management to change their role, behavior, and level of control, which allowed the Internet banking maintenance and modification

team to have team autonomy and empowerment toward problem-solving, action plan formulations, and action plan implementations. This proposed model has proved to be an effective model for process improvement within this research context.

7.1.1.5 Structured model for Internet banking problem-solving

The researcher adopts the five stages of action research and integrates these with the interventional change techniques as the Internet banking systems maintenance and modification problem-solving process. The introduction of the factor model allows team members to combine problems from all related departments into group problems. The group problems allow team members to see the holistic view of the Internet banking systems maintenance and modification phase. The factor model presents Internet banking problems in a structured manner. The structured problems allow team members to formulate effective action plans. The systematic action plans are straightforward to monitor and evaluate. Team members will be able to evaluate and specify the improvement of Internet banking systems and Internet banking services. Any unsolved problems will be investigated and analyzed for solutions. Therefore, the Internet banking problems will be solved in a systematic and structured manner.

7.1.2 Organizational contributions

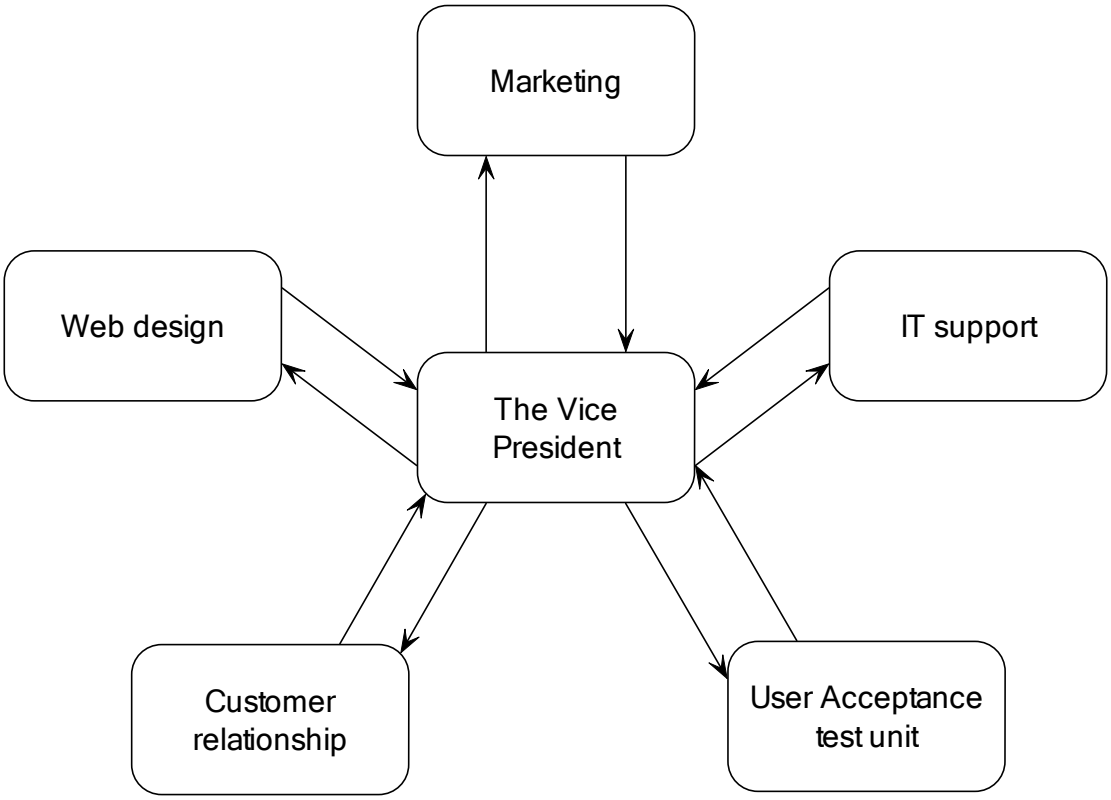
This research creates Internet banking systems maintenance and modification process improvement. There are four significant organizational contributions: effective communication between departments, good relationships and reduced conflict between departments, effective action plan formulation and implementation, and significant increase in Internet banking users and transactions.

7.1.2.1 Effective communication between departments

There is radical change in the structure of the Internet banking maintenance and modification process. The previous process was performed by related departments and each department performed individually and separately from the other departments. Each department’s performance was based on tasks assigned by the vice-president. Once each

department completed its assigned tasks, the completed tasks passed to the vice-president who then passed them to the next department. The summary of the previous Internet banking maintenance and modification process is shown in Figure 7.1.

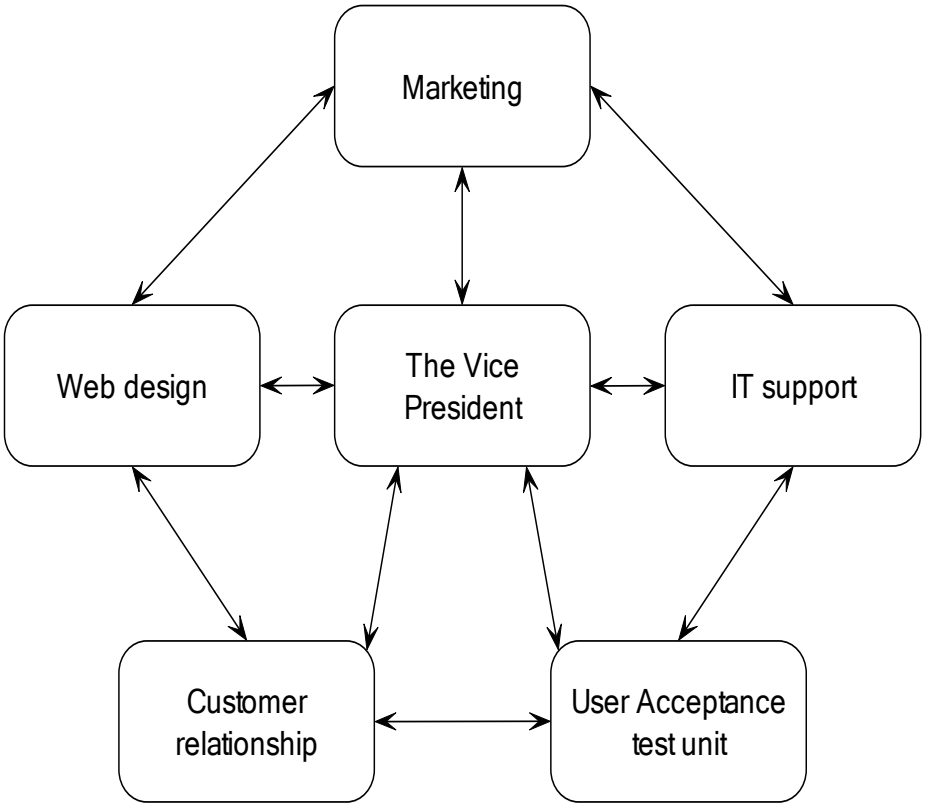
Figure 7.1:
Previous Internet banking systems maintenance and modification communication pattern (Star format)



The significant change derived from the Internet banking maintenance and modification process improvement model was that all related departments came together to work as a cross-functional multilevel team. All related departments shared their problems, knowledge, expertise, and goals. As a result, the Internet banking maintenance and modification process reduced in lifecycle time and increased in accuracy of actions taken toward problem-solving and enhancing Internet banking services. This process provided

effectiveness and efficiency for the process. A summary of Internet banking maintenance and modification process improvement is shown in Figure 7.2.

Figure 7.2:
Current Internet banking systems maintenance and modification communication pattern (Network format)



7.1.2.2 Good relationships and reduced conflict between related departments

The Internet banking maintenance and modification process improvement also created another significant change in its development process; team members have a new communication channel, greater communication and relationships. Team members represent their departments to communicate and cooperate with the other departments. The departmental participation allows team members to know each other and develop not

only their professional relationships but also their personal relationships. Team members gradually developed their friendship with mutual cooperation between departments. There is less conflict between departments because every department shares the same objectives and goals; they support each other to achieve the team's goals. All problems and conflict are readily identified and solved during the Internet banking systems maintenance and modification process improvement project.

7.1.2.3 Effective action plan formulation and implementation

The action plans are formulated effectively and accurately because all action plans are monitored and approved by the consensus of a team of experts in Internet banking systems maintenance and modification. All the action plans are coherent and support the maintenance and modification of Internet banking systems. The contradictory action plans and potential problems for formulated action plans are perceived and managed by team members. The formulated action plans are screened to become effective action plans for Internet banking systems maintenance and modification. In addition, all action plans are assigned project owners or problem owners who will be responsible for implementing the action plans.

7.1.2.4 Significant increase in Internet banking users and transactions

There was a significant reward for team members at the end of the Internet banking maintenance and modification process improvement project. The two main objectives were significantly achieved. A comparison of the statistical records of Internet banking users and transactions showed a significant increase in both these areas. Also, the monthly summary from the customer relationship department regularly reported substantial improvement. There were fewer complaints from Internet banking users regarding Internet banking usage problems. All regular problems were permanently solved and there were fewer odd requests from Internet banking users. The semistructured interview with bank users conducted by the researcher also showed significant improvement and a high level of satisfaction from Internet banking users.

7.2 Research implications

This research provides and suggests a number of contributions for both practitioners and researchers, especially those who attempt to achieve process improvement. These implications are discussed and presented in the next sections which are divided into implications for practitioners and researchers.

7.2.1 Implications for researchers

The research findings suggested that the Internet banking maintenance and modification process improvement was achieved through the introduction of a model for Internet banking maintenance and modification process, and interventional change techniques through a cross-functional multilevel team. The process improvement model and the interventional change techniques worked well and supported each other. The Internet banking maintenance and modification model assisted team members to perform effectively and efficiently for the process while the interventional change techniques created an environment that supported the change in the process.

7.2.1.1 The model

The research produced an alternative option for process improvement in the context of the Internet banking maintenance and modification process. The model included five main processes which were inspired by the work of Susman and Evered's (1978) action research model. Within the five main processes, there were subprocesses designed to achieve each main process. The subprocesses were specifically designed by the researcher and implemented during the project. These subprocesses are simple for other researchers to replicate. In addition, this Internet banking maintenance and modification process improvement model was not so specific that it was limited specifically to Internet banking maintenance and modification. This model was generic and sophisticated, useable for other domains of study. Therefore, this improvement process model could be implemented and tested in other contexts with ease and little complication.

7.2.1.2 Interventional change techniques to create an environment for change

There was evidence of the effectiveness of interventional change techniques in process improvement and change process at the research site. There was a significant change in the Internet banking maintenance and modification process. One of the four interventional change techniques alleviated the impact of power distance and uncertainty avoidance noted by Hofstede (1984). Management support was the most significant technique that needed to be accepted by the organization and management because without sufficient support there was no opportunity to establish departmental participation, equal participation, and the allocation of human resource and time. This research showed that management support was a critical success factor for change process in the Internet banking maintenance and modification process improvement model. The other two techniques were supportive techniques for the success of Internet banking maintenance and modification process improvement. Therefore, this research confirmed the significance of management support in process improvement and team effectiveness.

7.2.2 Implications for practitioners

The research findings suggested that Internet banking systems modification and maintenance process improvement can be achieved through a cross-functional team with the association of interventional change techniques. However, the research findings led the researcher to believe that organizations needed to pay careful attention during the formation of the team, by establishing an open environment, and providing support for team members.

7.2.2.1 The formation and environment of cross-functional team

The formation of the team and team environment were crucial for the success of Internet banking maintenance and modification process improvement. To achieve process improvement for Internet banking maintenance and modification, organizations needed to have complete skills within the team. Working as a team provided great opportunity for

Internet banking maintenance and modification team members to perform well. The cross-functional team contained a diversity of skills within itself.

One important implication of the effective team is that organizations need to concentrate on how the Internet banking maintenance and modification team was formed. This research confirmed that diversity of expertise or complete skills of team members allowed the team to identify problems and formulate action plans accurately. Team members were able to identify the potential problems of action plan formulation and implementation in advance. These benefits allowed team members to reduce Internet banking maintenance and modification lifecycle time. The team had an opportunity to launch new products and services faster than had been possible using the previous process.

The other significant implication is that team members needed to be able to share their knowledge and expertise with other team members. The knowledge sharing created extended knowledge and assisted team members to understand the broad picture and scope of their business process. The ability to see an holistic view of the process assisted team members to understand how they were involved and how the Internet banking maintenance and modification processes were executed.

By the end of the research process, team members had developed good relationships and friendships within the team. This promotes good relationships and reduces conflict between departments. Therefore, it is vital for organizations to develop good relationships between related departments in the Internet banking maintenance and modification process. Good relationships and friendships assisted a smooth operation and development process because these factors promote mutual agreement and cooperation among team members.

7.2.2.2 Support for team effectiveness

The achievement and effectiveness of the cross-functional team relied on the amount of support from organizations. The diversity of expertise alone was not sufficient to produce

Internet banking maintenance and modification team effectiveness and process improvement. Apart from a solid foundation, the team needed sufficient support from the organization. This was significantly important. Organizations needed to make sure that Internet banking maintenance and modification team receive sufficient support to achieve Internet banking maintenance and modification process improvement.

The first dimension was power decentralization; management needed to empower the team by providing a certain level of team autonomy in order to allow team members full control of problem-solving. The Internet banking maintenance and modification team needed the authority to identify problems, formulate, and implement action plans. Team members were the group of best people in their areas. The organization and management needed to trust team members to fulfill their responsibilities.

The second dimension was encouragement for equal participation. Even though one of the four interventional change techniques allowed team members to have an equal opportunity to participate, in reality, it was extremely difficult to change human nature from listening and following to participating and taking actions. This area is involved with individual personalities and characteristics. Some team members took the opportunity to participate during discussions and group meetings, but some team members were still keen to listen and follow. It was important for management to exploit and utilize the benefit of the cross-functional team and equal participation. Management needed to manipulate and try hard in order to stimulate team members to realize their full potential and produce a high performance. Management needed to demonstrate that they fully supported equal participation.

The final and important dimension was the allocation of human resources and time. It was hard to define the perfect number of team members. From the literature, 6 to 10 members were thought to constitute a good, balanced team. However, the team size was dependent on the number of departments or functions that related to the business process. From this research, six team members were about an average. Team members represented the entire department regarding the Internet banking maintenance and modification

process. They were experts in their area. The relatively small sized team worked well within this context. Therefore, the main concern for management was the involvement of every single department or function of the entire operational process. In terms of human resources, this factor was significant for supporting the cross-functional team. The organization had to ensure that the cross-functional team had sufficient manpower to carry out and achieve all action plan formulation and implementation.

7.2.3.3 Continuity of cross-functional multilevel team

The cross-functional multilevel team was established during the Internet banking maintenance and modification process improvement project. This process improvement project generated various contributions as mentioned in the research contribution sections during the period of action research intervention, but unfortunately, the process improvement improvements did not last long after the researcher concluded the intervention at the research site. No team member took ownership of the project, and the team members seemed to be fully occupied with their routine work.

Only short-term improvements in the Internet banking maintenance and modification process were achieved, and only temporarily. To sustain the process improvement achieved during the action research intervention, it seemed that there needed to be an internal project champion with available time and energy to put into the champion's role in order to maintain the process improvements to the Internet banking maintenance and modification process.

7.3 Research limitations

There were some limitations within this action research; some were inherent in the nature of research method and some were uncontrollable limitations.

7.3.1 Researcher involvement

The researcher appraoched and convinced the vice-president to allow this action research project; even though the researcher had no personal relationship with the vice-president the researcher received full support from him. Therefore, the researcher was in full control over the course of the whole action research project. Once the vice-president became the champion for change, all team members were told to listen and follow instructions from the researcher. There was a high level of control and influence from the researcher in this action research project. The other main source of bias came from the input and output from group meetings which were prepared and executed by the researcher. Therefore, the researcher had full authority to lead, guide, and manipulate team members and lead the research in an artificial direction. All team members were occupied with their workload; therefore, the back office work, administration work, and preparation work fell to the researcher. The researcher was in the position to potentially guide the direction of the research in his desired outcomes.

7.3.2 Single action research cycle

The other main limitation came from the nature of the Internet banking maintenance and modification process improvement action research itself. There was no opportunity for the researcher to work with the other commercial banks in order to test the Internet banking maintenance and modification process improvement model. There was no repetition or iteration of the action research cycle within this action research. The best option for the researcher was to complete the full action research cycle and identify the results and key findings from the research; then, to hope for another researcher to test and replicate the same model in other contexts or organizations. Therefore, there was no cross-comparison among multiple cycles or iterations. There was no guarantee of the same research findings in other organizations or contexts.

7.3.3 Insufficient sample size

There were only six team members within this Internet banking maintenance and modification process improvement project which included the researcher as one of the

team members. The small and compact size of the team provided various benefits, for example, mobility, flexibility, good communication, high level of consensus and compromise, and dynamic team culture toward team effectiveness. The small sample size or unit of analysis was the fragile point, preventing solid research findings. The effectiveness of the Internet banking maintenance and modification process improvement model and interventional change techniques needed to be measured and judged by a small number of team members. The best option for the researcher was to triangulate the team members' reflections with statistical data and Internet banking users' feedback. However, the small sample size looked vulnerable and inadequate for solid research findings.

7.3.4 Specific case study

This research context was too specific. The Internet banking systems modification and maintenance process improvement model and interventional change techniques were designed and solved problems for a particular Internet banking systems modification and maintenance process of a particular commercial bank. However, the nature and operational process of the other commercial banks may be different from those of the research partner. The model and techniques worked effectively and efficiently for the research partner but the model and techniques might not work well for other banks in different contexts. Therefore, the research findings from this research may not be able to be generalized to other research contexts.

7.4 Opportunity for future research

7.4.1 Model of structured problem-solving

This research has the potential to produce a structured problem-solving model for Internet banking maintenance and modification, even though this model was exclusively designed for one particular organization to use in a particular context. The overall processes were identified and managed in a structural way which could be followed and replicated. This model needs to be redefined in order to be applicable to general contexts. Some of the

subprocesses needed some modification to fit with the context of future studies. The research findings showed that the Internet banking maintenance and modification model was a powerful and effective model for problem-solving. The result of further studies will be able to generate a more generic model for problem-solving.

7.4.2 Interventional change techniques

The research findings also supported the idea that the four techniques were effective in creating change and team effectiveness. Some techniques confirmed and supported the existing knowledge that they were able to create team effectiveness in increased team performance. The techniques of equal participation, departmental participation, and holistic scenario were not clearly defined as techniques or factors that enable and foster team effectiveness and team performance. The research findings showed that there were several benefits from these three techniques that promote and generate team performance and team effectiveness. Therefore, these two techniques deserve to be researched in the future.

7.4.3 Process improvement model

The literature revealed that several methods were able to create process improvement. The results from this research proved that the association of the Internet banking maintenance and modification process improvement model and interventional change techniques was an alternative method to create process improvement via a cross-functional team. Within this research, some of the interventional change techniques assisted the researcher to achieve the change process and create the new working environment for creating Internet banking maintenance and modification process improvement. The model of the Internet banking maintenance and modification process improvement worked well within the context of Internet banking maintenance and modification for the Bank of Asia. The challenge for this model is whether or not this model will generate the same results in different settings and contexts which are not in the Internet banking maintenance and modification area. This research model shed new light on the existing knowledge of process improvement in terms of a new method, most

especially the conjunction with the teamwork concept in the context of Internet banking. In the Internet banking domain, there was no previous research in the areas of process improvement, even in the context of systems development or the postimplementation context.

7.5 Summary

This chapter presents some of the research contributions from both academic and practitioner viewpoints. The interventional change techniques work well for the Internet banking systems maintenance and modification phase process improvement. There are several significant changes in the bank's Internet banking systems maintenance and modification phase. These interventional change techniques are generic techniques which the researcher believes will be able to be applied to different contexts. The future of this research is to implement these four interventional change techniques in different contexts and test the techniques for their generalizability and reliability.

Appendix A: Action research preparation

Appendix A1:
The criteria for approaching research partner

Commercial banks	Various functions of Internet banking services	Awareness as Internet banking service provider by customers	Rating & rank Internet banking	Researcher's connection with banks
Thai Farmer Bank (TFB)	☑	☑	☑	☒
Siam Commercial Bank (SCB)	☑	☑	☑	☒
Bank of Asia (BOA)	☑	☑	☑	☑
Bangkok Bank (BBL)	☑	☑	☑	☑
Krung Thai Bank (KTB)	☒	☒	☒	☒
Thai Military Bank (TMB)	☑	☑	☑	☒
Standard Chartered Nakornthon Bank (SCNB)	☒	☒	☒	☒
DBS Thai Danu Bank (DTDB)	☒	☒	☒	☒
Bank of Ayudhya (BAY)	☑	☑	☑	☑
UOB Radhanasin (UOBR)	☒	☒	☒	☒
Bankthai Bank (BT)	☒	☒	☒	☒
Siam City Bank (SCIB)	☑	☒	☒	☒
Bangkok Metropolitan Bank (BMB)	☒	☒	☒	☒

Source: Adapted from Ongkasuwan and Tantichattanon, (2002, p.10-11).

Appendix A2:
The summary table of the factors affecting Internet banking adoption

Factors	IBDT 01	IBDT 02	IBDT 03	IBDT 04	IBDT 05	IBDT 06	Frequency
Trust issues / distrust systems	☑	☑		☑		☑	4
Number of Internet users				☑		☑	2
Security systems		☑		☑	☑	☑	4
Unaware of the benefits of using Internet banking	☑			☑			2
Access to Internet / connectivity				☑		☑	2
Response time/download time				☑	☑	☑	3
Internet banking registration				☑	☑	☑	2
Internet literacy or knowledge				☑		☑	2
Internet banking systems stability			☑	☑	☑		3
Features and functions				☑		☑	2
Promotion and campaign		☑		☑	☑		3
Needed technical supports to solve technical problems		☑		☑	☑	☑	4
User interfaces / ease of use / usability				☑	☑	☑	3
Unfamiliar with Internet and Internet banking systems	☑	☑	☑				3
Systems failure during transaction			☑				1
Customers' demand for Internet banking						☑	1
Complicated process	☑						1
Unclear procedures	☑						1
Unsatisfactory experiences	☑						1
Do not understand security functions	☑						1
Prefer personal contact with retailers						☑	1

Factors	IBDT 01	IBDT 02	IBDT 03	IBDT 04	IBDT 05	IBDT 06	Frequency
Range of services					☑	☑	2
Compatibility with lifestyle						☑	1
Legal issues						☑	1
Bank's reputation					☑		1
Cost aspect/ cost of using Inernet	☑				☑		2
Prefer printed document for confirmation of completed transactions	☑						1

Source: IBDTs from The 1st team activity: the problem identification technique via the factors model

Appendix A3:
Summary table of prioritizing factors in Internet banking adoption

Factors	Categories	Frequency	Priority
Needed technical supports to solve technical problems	Users	4	1st
Trust issues/ distrust systems	Users	4	
Unfamiliar with Internet and Internet banking systems	Users	3	
Access to Internet / connectivity	Users	2	2nd
Internet literacy or knowledge	Users	2	
Number of Internet users	Users	2	
Customers' demand for Internet banking	Users	1	3rd
Unsatisfactory experiences	Users	1	
Do not understand security functions	Users	1	
Prefer personal contact with retailers	Users	1	
Compatibility with lifestyle	Users	1	
Prefer printed document for confirmation of completed transactions	Users	1	
Security systems	Systems	4	1st
User interfaces / ease of use / usability	Systems	3	
Response time/download time	Systems	3	
Internet banking systems stability	Systems	3	
Internet banking registration	Systems	2	2nd
Range of services	Systems	2	
Features and functions	Systems	2	
Systems failure during transaction	Systems	1	3rd

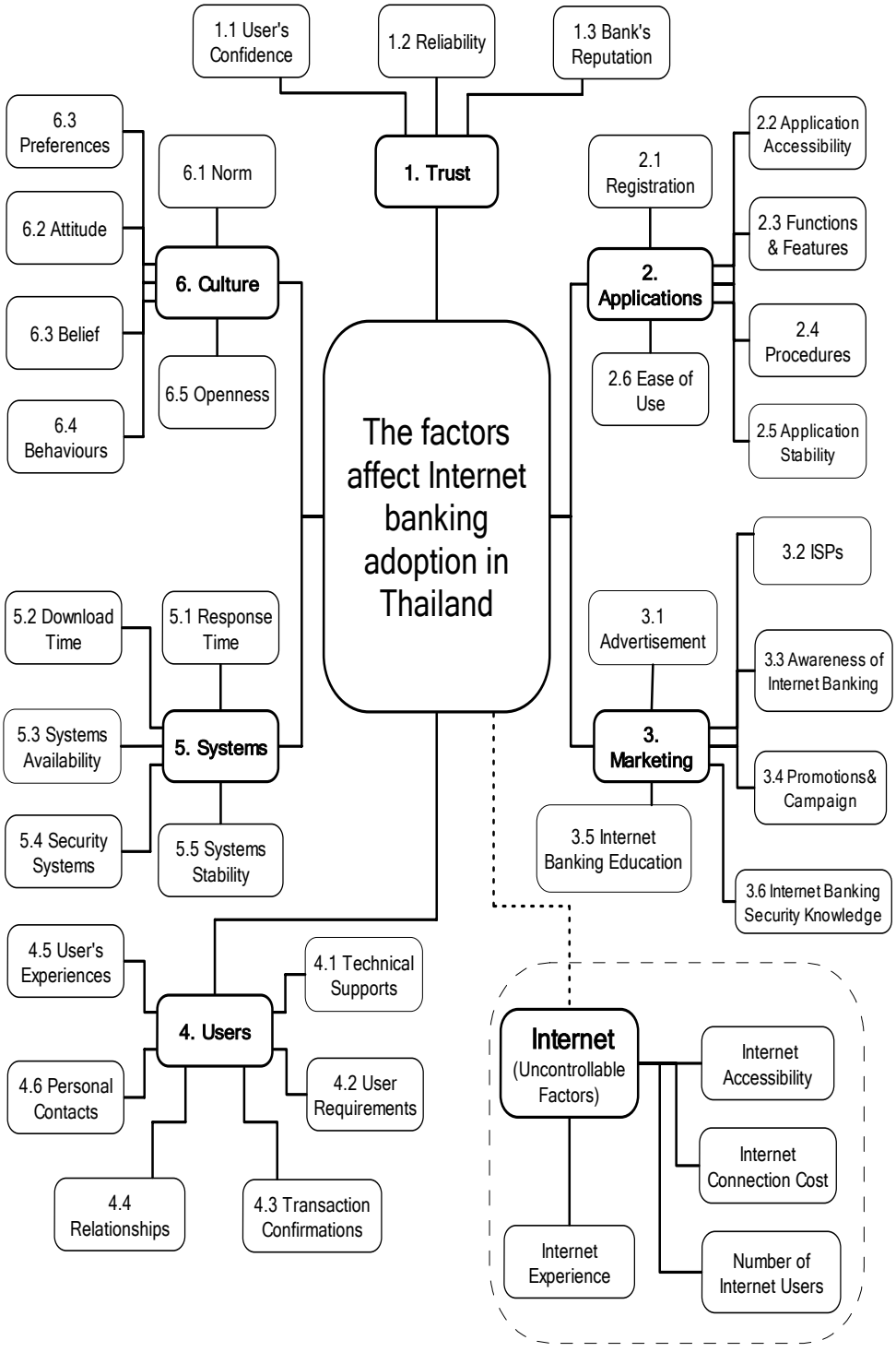
Factors	Categories	Frequency	Priority
Complicated process	Systems	1	
Unclear procedures	Systems	1	
Promotion and campaign	Marketing	3	1st
Cost aspect / cost of using Internet	Marketing	2	2nd
Unaware of the benefits of using Internet banking	Marketing	2	
Bank's reputation	Marketing	1	3rd

Source: Action research group members

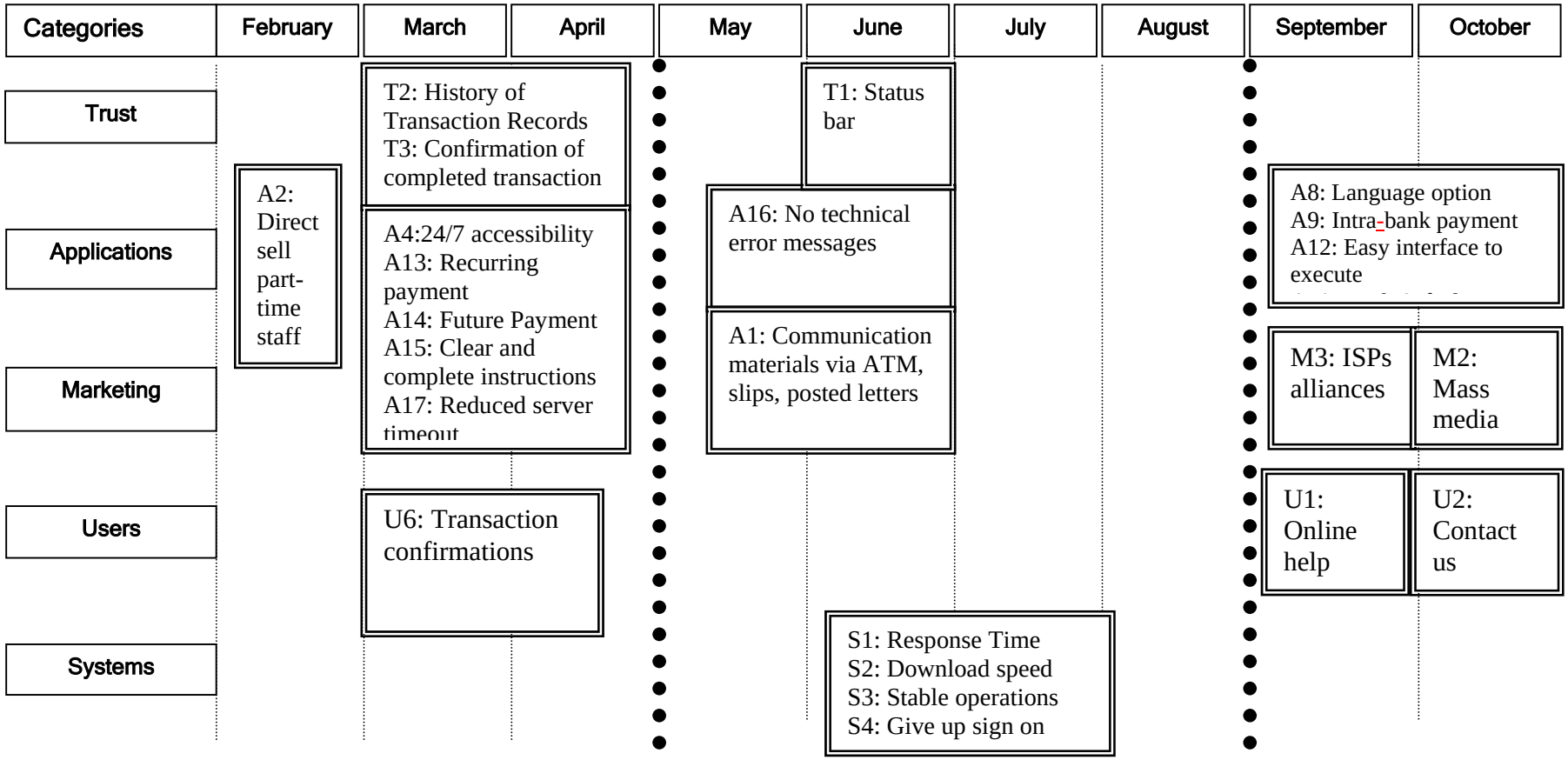
Appendix A4:
Summary table for the development of the factors model

Categories	Version 1	Version 2	Version 3	Version 4	Version 5
Interface	☑	☒	☒	☒	☒
Application	☒	☑	☑	☑	☑
Marketing	☑	☑	☑	☑	☑
Internet	☑	☑	☒	☒	☒
Trust	☑	☑	☑	☑	☑
Users	☑	☑	☑	☑	☑
Systems	☑	☑	☑	☑	☑
Culture	☒	☒	☒	☒	☑
Internet (Uncontrollable factors)	☒	☒	☑	☑	☑

Appendix A5:
The factors model version 5



Appendix A6:
Timeline for action plans version 6



Appendix B: Data collection

Appendix B1:
The consent form

Information Sheet for Participants

1. Title of Project:
Persuading and Facilitating a Desired Customer Shift to Internet Banking: An Action Research Study of a Thailand Commercial Bank.

2. Research supervisor's name and contact information:
Prof Robert McQueen,
Dept of Management Systems, University of Waikato, Hamilton
Telephone: 07 838 4126
Email: bmcqueen@waikato.ac.nz

3. Brief Outline of the Research Project:
This research emphasis is on facilitating and investigating how a Thai commercial bank develops Internet banking projects.

4. Organization supporting the research:
This research is supported by Dept of Management Systems, University of Waikato and Bank of Asia.

5. Explain how any publications and/or reports will have the consent of participants, and how the anonymity of participants will be protected.

All data collected by the researcher will be held confidentially and stored securely. The name of the organization and the names of the action research group members will be disguised in any publications resulting from this research so that their comments cannot be traced. No publication of the specific name of a participant will be presented without prior formal consent from the participant.

6. Participants have the right, at anytime before, during or after the interview, to:

a) refuse to answer any particular question, and withdraw from the study at any time;
b) ask any further questions about the study; and
c) be given access to a summary of the findings from the study when it is concluded.

7. Explain what will happen to the information collected from participant.
All data collected will be held securely and confidentially until the analysis and research findings are completed, the data will be destroyed securely.

THE UNIVERSITY OF WAIKATO

Waikato Management School

Consent Form for Participants

I have read the **Information Sheet for Participants** form for this study and have had the details of the study explained to me. My questions about the study have been answered to my satisfaction, and I understand that I may ask further questions at any time.

I also understand that I am free to withdraw from the study at any time, or to decline to answer any particular questions in the study. I agree to provide information to the researchers under the conditions of confidentiality set out on the **Information Sheet for Participants**.

I agree to participate in this study under the conditions set out in the **Information Sheet for Participants form**.

Signed: _____

Name: _____

Date: _____

Interviewer's name and contact information:

Researcher name and contact information:
Chansit Siritanachot, PhD Candidate
Department of Management Systems, Waikato Management School, The University of Waikato, Private Bag 3105, Hamilton
cs8@waikato.ac.nz
+64 7 8384466 ext 6056

Supervisor's name and contact information:
Professor Robert J. McQueen
Department of Management Systems, Waikato Management School, The University of Waikato, Private Bag 3105, Hamilton
bmcqueen@waikato.ac.nz
+64 7 8384126

Appendix B2:
Internet banking development team members' research interview questions

1. IBDTs general information

What is your name?

What is your position and function in the organization?

How does your work relate to Internet banking?

How many years of work experience do you have?

Have you ever heard about action research? If so, have you ever participated in an action research project?

2. Internet banking service development process

2.1 Research Question: Problem identification

Question 2.1.1: Does the use of a factors model for problems identification create a more or less clear Internet banking scenario?

Question 2.1.2: Does the clear Internet banking scenario help IBDTs create more or less the effective action plans?

2.2 Research question: Equal participation

Question 2.2.1: Does the use of equal participation technique create a greater or lesser degree of willingness to participate among IBDTs?

Question 2.2.2: Does the degree of willingness help IBDTs to create a more or less effective team performance?

Question 2.2.3: Does the use of the equal participation technique create a greater or lesser degree of openness to participate among IBDTs?

Question 2.2.4: Does the degree of openness help IBDTs to create a more or less effective team performance?

2.3 Research question: Interdepartmental cooperation

Question 2.3.1: Does the used of the interdepartmental cooperation technique provide more or less diversity of expertise?

Question 2.3.2: Does the diversity of expertise help IBDTs to create a more or less effective team performance?

Question 2.3.3: Does the use of interdepartmental cooperation techniques provide more or less shared knowledge and information?
Question 2.3.4: Does the shared knowledge and information help IBDTs to create a more or less effective team performance?

2.4. Research question: Team orientation

Question 2.4.1: Does the use of team orientation technique create a greater or lesser sense of ownership?
Question 2.4.2: Does the sense of ownership help IBDTs to create a more or less effective team performance?
Question 2.4.3: Does the use of team orientation technique create more or less team commitment?
Question 2.4.4: Does the team commitment help IBDTs to create a more or less effective team performance?
Question 2.4.5: Does the use of team orientation technique create more or less team learning?
Question 2.4.6: Does the team learning help IBDTs to create a more or less effective team performance?
Question 2.4.7: Does the use of team orientation technique create more or less sharing of the same objectives?
Question 2.4.8: Does the sharing of the same objectives help IBDTs to create a more or less effective team performance
Question 2.4.9: Does the use of team orientation technique create more or less sharing of the same problems?
Question 2.4.10: Does the sharing of the same problems help IBDTs to create a more or less effective team performance?

2.5 Research question: Effective team performance and clear Internet banking scenario

Question 2.5.1: Does the clear Internet banking scenario and effective team performance create more or less effective action plans?
Question 2.5.2: Do the effective action plans help IBDTs to have more or less insight knowledge into Internet banking?

Question 2.5.3: Does the insight into Internet banking help IBDTs to develop better Internet banking services?

3. IBDTs learning specification and researcher intervention

3.1 Prior to action research project

Question 3.3.1: Previously, how did you normally develop Internet banking services?

Question 3.3.2: What was the previous process of Internet banking service development?

Question 3.3.3: How many department and people were involved in the Internet banking development process?

3.2 During action research project

Question 3.2.1: Are there any changes in the Internet banking development process between prior action research project and during action research project?

Question 3.2.2: How do you feel about the Internet banking development process?

Question 3.2.3: Does the action research project contribute any significant performance?

Question 3.2.4: What do you learn from the process of action research?

Question 3.2.5: What are the issues of Internet banking development process that have been done correctly?

Question 3.2.6: What are the issues of Internet banking development process that have been done incorrectly?

3.3 IBDTs' learning experience

Question 3.3.1: What did you learn from the action research project?

Question 3.3.2: Does this action research create or extend the knowledge of Internet banking in Thailand? What? How?

Question 3.3.3: What are the effective strategies to increase the number of Internet banking users and transactions? Why?

3.4 The researcher intervention

Question 3.4.1: Does the researcher bring any change in the Internet banking development process? How? What is the change?

Question 3.4.2: Does the change that occurs during the Internet banking development process contribute significant performance? How?

Question 3.4.3: What are the issues that the researcher has done right?

Question 3.4.4: What are the issues that the researcher has done wrong?

Question 3.4.5: How well does the researcher contribute to the action research project for Internet banking development? How?

Question 3.4.6: How do you evaluate the performance of the researcher?

3.5 What if? (Further improvement)

***Question 3.5.1*:** What should have been done to improve the performance and quality of the Internet banking development process?

Appendix B3:
The first interviews with bank's customers

Activated Internet Banking Users (AIB)

Part1: Internet usage

1. How long have you been using the Internet?
2. How long do you connect to Internet?
3. How often do you connect to Internet per week?

Part2: General information

1. Have you ever heard about Internet banking services?
2. Have you ever used Internet banking services?
3. What is Internet banking in your opinion?
4. Do you know of any benefits from using Internet banking?

Part3: Internet banking usage

1. Why do you choose to use and conduct your financial activities via Internet banking?
2. What are the benefits you recieve from Internet banking?
3. Which services do you use mostly from Internet banking services range?
4. When did you register and use Internet banking services?
5. How did you know about Internet banking?
6. What are the factors that encourgae you to use Internet banking?
7. Is it difficult to login to Internet banking systems?
8. How easy is it to use Internet banking services?
9. How do you feel about the speed of Internet banking services?
10. Which of the Internet banking services do you like?
11. Do you trust Internet banking systems?
12. Have you ever come across Internet banking problems?
13. How would you want Internet banking systems to be improved and modified?
14. Would you recommend other people use Internet banking services?
15. Will you still use Internet banking, if there is Internet banking services chagre?

Part4: Participant's opinion regarding Internet banking

1. Does Internet banking provide you more convenient financial activities?
2. Does Internet banking assist you in managing and controling your financial activities more effectively?
3. Does Internet banking suit your working life and your lifestyle?
4. Does Internet banking easy to use?
5. Does Internet banking give you freedom in your financial activities?
6. Do you feel stressed while using Internet banking services?
7. Do you feel you need to be more careful when using Internet banking services?
8. Do you pervieve Internet banking as high risk?
9. Does Internet banking chnage your daily life?
10. Is Internet banking costly to use?

Part5: Factors affecting decision to adopt Internet banking

Factors	**Rank**	**The level of effect from factors toward IB adoption**				
		1 = Relatively low 3 = Moderate 5 = Relatively high				
		1	**2**	**3**	**4**	**5**
1.Trust						
2.Risk issues						
3.Privacy						
4.Usefulness						
5.Compatibility						
6.Ease of use						
7.Look & feel						
8.Internet connectivity						
9.Internet & computer literacy						
10.Culture, value, and habits						
11.Resistance to change						

12.Relation & communication						

Inactivated Internet Banking Users (IIB)

Part1: Internet usage

1. How long have you been using the Internet?
2. How long do you connect to Internet?
3. How often do you connect to Internet per week?

Part2: General information

1. Have you ever heard about Internet banking services?
2. Have you ever used Internet banking services?
3. What is Internet banking in your opinion?
4. Do you know of any benefits from using Internet banking?

Part3: Internet banking Usage

1. When did you apply for Internet banking?
2. Have you even thought about using Internet banking services?
3. What is your reason for not using Internet banking services?
4. What is your reason to go to bank brand for financial activities?
5. How do you feel when you go to bank barach and use its services at the baranch?
6. Do you know that Internet banking providet you convenience finacial activities?
7. How much do you trust Internet banking services?
8. What services do you want from Internet banking?
9. If bank would like you to adopt Internet banking services, what should bank does?

Part4: Participant's opinion regarding Internet banking

Note: Please provide your opinion regarding the following questions

1. Does Internet banking provide you more convenient financial activities?
2. Does Internet banking assist you in managing and controling your financial activities more effectively?
3. Does Internet banking suit your working life and your lifestyle?
4. Does Internet banking easy to use?
5. Does Internet banking give you freedom in your financial activities?
6. Do you feel stressed while using Internet banking services?
7. Do you feel you need to be more careful when using Internet banking services?
8. Do you pervieve Internet banking as high risk?
9. Does Internet banking chnage your daily life?
10. Is Internet banking costly to use?
11.

Part5: Factors affecting decision to adopt Internet banking

Factors	**Rank**	**The level of effect from factors toward IB adoption**				
		1 = Relatively low 3 = Moderate 5 = Relatively high				
		1	**2**	**3**	**4**	**5**
1.Trust						
2.Risk issues						
3.Privacy						
4.Usefulness						
5.Compatibility						
6.Ease of use						
7.Look & feel						
8.Internet connectivity						
9.Internet & computer literacy						
10.Culture, value, and habits						
11.Resistance to change						
12.Relation & communication						

NonInternet Banking Users (NIB)

Part1: Internet usage

1. How long have you been using the Internet?
2. How long do you connect to Internet?
3. How often do you connect to Internet per week?

Part2: General information

1. Have you ever heard about Internet banking services?
2. Have you ever used Internet banking services?
3. What is Internet banking in your opinion?
4. Do you know of any benefits from using Internet banking?

Part3: Internet banking Usage

5. Do you know that bank currrently provide Internet banking services?
6. Have you even thought about useing Internet banking services and why?
7. What is your reason for not using Internet banking services?
8. What is your reason to go to bank brand for financial activities?
9. How do you feel when you go to bank barach and use its services at the baranch?
10. Do you know that Internet banking assist you with a convenience finacial activities?
11. เท่าใด How much do you trust Internet banking services?
12. What services do you want from Internet banking?
13. If bank would like you to adopt Internet banking services, what should bank does?

Part4: Participant’s opinion regarding Internet banking

Note: Please provide your opinion regarding the following questions

1. Does Internet banking provide you more convenient financial activities?
2. Does Internet banking assist you in managing and controling your financial activities more effectively?

3. Does Internet banking suit your working life and your lifestyle?
4. Does Internet banking easy to use?
5. Does Internet banking give you freedom in your financial activities?
6. Do you feel stressed while using Internet banking services?
7. Do you feel you need to be more careful when using Internet banking services?
8. Do you pervieve Internet banking as high risk?
9. Does Internet banking chnage your daily life?
10. Is Internet banking costly to use?

Part5: Factors affecting decision to adopt Internet banking

Factors	**Rank**	**The level of effect from factors toward IB adoption**				
		1 = Relatively low 3 = Moderate 5 = Relatively high				
		1	**2**	**3**	**4**	**5**
1.Trust						
2.Risk issues						
3.Privacy						
4.Usefulness						
5.Compatibility						
6.Ease of use						
7.Look & feel						
8.Internet connectivity						
9.Internet & computer literacy						
10.Culture, value, and habits						
11.Resistance to change						
12.Relation & communication						

Appendix B4:
The second interviews with bank's customers

AIB 2nd Interview Answer Sheet

Code: AIB ____
Date: ___/___/_____
Name: _____
E-mail address: _____
Organization: _____

1. you use DoInternet banking more often in term of frequency and duration, and number of transactions?

_____
_____

2. Do you have more satisfaction withInternet banking services than ?nelnhatraditional c

_____
_____

3. Have you ever suggested anyInternet banking services improvement? If so, have your suggestions been implemented?

_____
_____

4. Do you have any further recommendations and suggestions for Internet banking systems and services improvement?

_____
_____

NIB & IIB 2nd Interview Answer Sheet

Code: NIB ____
Date: ___/___/_____
Name: _____
E-mail address: _____
Organization: _____

1. Have you registered for Internet banking? If so, you have not registered please answer 1.2 and 1.3. Do you use Internet banking? If so, please answer 1.1 and then please answer question 2 to 12.

1.1 What are your reasones for registering forInternet banking?

_____
_____

1.2. What are youir reasons for not registering forInternet banking?

_____
_____

1.3 Internet Will you register for banking in the future?

_____
_____

2. el satified withDo you feInternet banking services?

_____
_____

3. Do you have any problems while using Internet banking services?

_____
_____

4. How do you feel aboutLog in or Sign in for Internet banking systems?

_____
_____

5. Internet How do you feel about banking systems?

_____
_____

6. Are Internet banking functions and features easy to use? (Ease of use)

_____
_____

7. Are Internet banking interfaces easy to navigate? (User Interface)

_____
_____

8. banking systems? Internet How do you feel about the speed of)Download speed)

_____
_____

9. banking systems? Internet Do you trust(Trust)

_____
_____

10. netInter Do you want to suggest any recommendations for banking services improvement? If so what are your recommendations or suggestions?

_____
_____

11. Will you introduce or recommenInternet banking to other people?

_____
_____

12. Will you still useInternet banking if there is Internet banking cost?

_____
_____

Appendix B5:
The summary of findings for bank customer interviews

Summary of the rationale for Activated Internet banking users (AIB) to adopt IB

The rationale to adopt IB	Frequency	Percentage
Fast baking activity	16	100.00
Convenience service	15	93.75
Save time	14	87.50
No long queue	13	81.25
No need to go to bank	12	75.00
Freedom to do banking activity	12	75.00
Free of charge	10	62.50
No rush lunch hour	10	62.50
Have more free time	7	43.75
Transaction history & bank statement	2	12.50
Have control over financial activities	1	6.25
IT trend	1	6.25
Friend using IB	1	6.25
IT people	1	6.25
Updated news	1	6.25
Real time information	1	6.25
Have more privacy	1	6.25

Summary of Activated Internet banking users (AIB) usage and problems

Subject	Score	Percentage
More IB usages	11	68.25
Satisfaction level	57	3.80
Problems regarding IB usage	**Score**	**Percentage**
Hard to find log in	6	40.00
Systems hard to use	4	26.60
More than 3 clicks	4	26.60
English language	3	20.00
Do not understand icon/user interface	3	20.00
Long time process	1	6.60
Unclear explanations	1	6.60
Front too small	1	6.60
More services / functions	1	6.60
Need website’s reference for doc.	1	6.60
Need IB station in public areas	1	6.60
Keep update website photos	1	6.60

Summary of Non-Internet banking users (NIB) switch to Activated Internet banking users (AIB) and problems

Subject	Score	Percentage
Adoption of IB	21	63.63
Satisfaction level	72	3.43
Problems regarding IB usage	**Score**	**Percentage**
Do not understand icon/user interface	5	23.80
Systems hard to use	3	14.28
Hard to find log in	3	14.28
More than 3 clicks	3	14.28
Long time process	3	14.28
English language	2	9.52
Unclear explanations	1	4.76
Front too small	1	4.76
Slow log in period	1	4.76
Need confirmation via e-mail	1	4.76
Need real time information update	1	4.76

Summary of NonInternet banking users (NIB) & Inactivated Internet banking users (IIB)

Subject	Score	Percentage
Know BOA IB availability	24	72.72
Think trying IB	13	39.39
Know IB services	6	18.18
Want to use After IB education	31	93.93
Actual status	23	69.69
Reason for not using IB	**Score**	**Percentage**
No demand for IB	22	66.66
Do not know IB service & benefits	7	21.21
Prefer to go to bank	5	15.15
Too busy	5	15.15
Not used to Internet	3	9.00
Not using much Internet	3	9.00
No reference doc.	2	6.00
No bank staff introduce IB	2	6.00
Do not know clear IB information	2	6.00
English language problem	2	6.00
Too complicated to register IB	2	6.00
Slow Internet	2	6.00
No friends use IB	1	3.00
Too much information to fill in	1	3.00

Summary of the rationale for NonInternet banking users (NIB) to adopt IB

Rationale to adopt IB	Frequency	Percentage
Fast baking activity	15	75.00
Convenience service	15	75.00
Save travel time	15	75.00
No need to go to bank	13	65.00
Free of charge	12	60.00
No long queue	11	55.00
Freedom to do banking activity	11	55.00
Have more free time	10	50.00
No rush lunch hour	9	45.00

Summary of Factors affecting Internet banking adoption

Factors	Score	Average
Trust	70	4.10
Risk	67	3.98
Privacy	67	3.98
Internet connection	65	3.78
Benefits	64	3.83
Internet & computer literacy	61	3.51
Compatibility	60	3.73
Ease of use	60	3.73
Culture, value, and habits	56	3.27
Resistance to change	56	3.27
Look & feel	49	3.24
Relationship and personal communication	49	2.61

Things to improve for Internet banking service and operation from Activated Internet banking users (AIB)

Problems: Activated Internet banking users (AIB)

AIB01: slow log in or sign in/ hard to find sign in page/ difficult user interface/ submit then wait for long without signal or movement/ hard to interact with systems/ need high level of effort to find where to go and click/ icons can not communicate well/ no sign after submit/ no status bar or sign of movement/ during wait for log in if user clicks many time, problem will happen/ accidental log off without intention
AIB02: interface not friendly/ English user interface hard to understand/ interface hard to use for non-IT users/ ambiguous description or explanation/ need to analyse what the icons mean/ icons can not communicate properly/ need confirmed information in case of transaction incomplete
AIB03: speed just ok not very fast/ text too small can not be seen clearly
AIB04: error during transaction causes high level of worry for user
AIB05: can not download text to excel/ systems still slow
AIB06: hard to find menu bar or difficult to find sign in page/ slow server process to query for data during last 2-3 months/ Asiacyber banking link does not work, need to go to image for link page which does not make sense for sign in/ user interface or icon can not communicate well enough/ unclear descriptions for all services such as what is this service? and what is this service for?
AIB07: systems still slow in processing transaction and response/
AIB08: too many technical words then need time and effort to understand/ text too small and too tight hard to read/ small menu bar hard to see/ slow when sign in process but once access to system it is ok/ English language will be problem for non-English speaking users

AIB09: too many clicks/ icon can not communicate well/ too many details on web page/ feel uncomfortable to see/ information too congested
AIB10: still hard to use / do not know where to click/ icon can not communicate well
AIB11: log in takes long time to find log in page/ need many times and effort to log in/ too many pages to log in/ take up to 1 minute for log in process/ too many text feel uncomfortable to read and use/ text too small cause the difficulty to read/ dark green color feel too heavy and not easy and relaxed to look at
AIB12: difficult to use English language/ confused pictures
AIB13: slower than SCB/ icon can not communicate well
AIB14: slow during log in process/ still not easy to use/ English language problem/ not quite well understand description/ low speed download and response time/ used to have “already sign on” problem but it is ok now
AIB15: hard to find link for sign in/ limited billers
AIB16: automatic log off 5 minutes/ format of receipt/ save but can not reopen/ don’t know file surname/ can not open on user’s computer/ need update detail after ERROR or system down

Improvements: Activated Internet banking users (AIB)

AIB01: too many services cause high level of confusion such as what is the difference between m-banking and m-payment/ services hard to understand and use/ automatic log out period/ need status bar/ re-login
AIB02: easy user interface for non-IT users/ need confirmation page for complete transaction/ need a proper confirm document with logo or heading to confirm the document comes from BoA/ increase creditability for downloaded documents/ need statement history of 5-6 months 2-3 months not enough/ need simple application, interface for non-IT users
AIB03: transfer across banks
AIB04: need more functions, promotion such as bonus on IB usage like Asia reward or reduction for credit card debit
AIB05: download text to excel format/ better look & feel: not too many text and image
AIB06: clear information for all services such as what is this service? and what is this service for? / need more clear descriptions such as dialog box/ need proper reference page for completed transaction or downloaded information such as statements and confirm for completed transactions/ hard to edit bank documents/ Bank logo or guarantee for authentication from bank
AIB07: need URL reference on bank printed documents/ need third party authorization for security measurement such as VeriSigned, also need to educate customers about the security measurements and the guaranteed 3rd party for security measurement/ need clear and well established policy for problem management and problem-solving/ bank need to respond to all problems which occurred and provide the best solutions for correction/ need more services such as loan application and others
AIB08: need bigger text and menu bar/ sign in page easy to find/ need like to

other service such as home for sale / need Thai language option
AIB09: need icon contact bank for questions or report for problems
AIB10: sign in should be web page not pop up/ easy to find sign in page/ provide information about security 3rd party and educate what is 3rd party security and why 3rd party/ need logo 3rd party for build up trust in security systems/ need more self service function in IB
AIB11: need to promote more at bank branch/ have demo version for demonstration at bank branch/ have information provided at bank branch or other channels/ small room for IB user in bank branch or other place
AIB12: need language option/ proper photo on website
AIB13: icon easy to understand/ promotion and benefits/ inter bank transfer
AIB14: reduce technical terms
AIB15: need information for format type of user ID and password such as alphabet, numeric, or e-mail/ need more billers for payments
AIB16: need common format for printed documents or download files/ need more bill payments/ need more detail on bill payments such as who is biller?, when transaction complete

NonInternet banking users (NIB) demands and recommendations

NIB01: need more bill payments options/ need slip of completed transaction send to home address
BoA should prepare and send full information of IB to home address
NIB02: need better ISP in terms of speed, cost/ high security measurement/ system stability/
BoA should make an alliance with ISP/ set up computer for demo at branch/ present the benefits of IB
NIB03: payments for all services/ international fund transfer/ provide loan application/ high security
BoA should launch promotion such as gift, present, and reward system/ assign staff to explain about IB, what is IB? What IB can do for the customer? What are the benefits that customers will receive from using IB?
NIB04: need deposit function/ deposit cheque via IB
BoA should introduce and educate customer about IB/ fully explain about IB/ need to inform about IB service availability
NIB05: need warning service for credit card to personal mail
BoA should provide call center for answering questions/ recommend the IB services/
NIB06: inter bank fund transfer
BoA should provide advantages and disadvantages of using IB/ accurate information and data
NIB07: need secure transaction and trust of using IB/ trustable IB systems
BoA should educate and or recommend how to use IB/ promote and provide information about IB
NIB08: need inter bank transfer
BoA should promote or present about IB in terms of benefits and how to use IB

NIB09: inter bank transfer/ Thai language option/ less detail during register/
BoA should promote IB regarding its benefits and process/ need to educate non-IT users about IB
NIB10: N/A
BoA should provide more information about IB in full detail
NIB11: N/A
BoA should promote IB service availability/ use advertisement and mass media
NIB12: inter bank transfer
BoA should provide correct/accurate information and complete information to create trust among users/ need confirmation document for completed transaction
NIB13: services as same as counter/ be an online marketplace/ transaction via bank's guarantee
BoA should send information to bank customers, don't wait for customer to take brochure from branch/ need easy explanations of IB procedure and usages/ clear explanation regarding security/ send information to customer's home address
NIB14: N/A
BoA should promote because the user never ever know about IB service / there is no information from bank to home address/ brochures at branch are not interesting to read and boring information
NIB15: need home loan online application and information
BoA should provide more differentiated service
NIB16: inter bank transfer
BoA should e-mail for update service or news/ bank staff be able to educate customers/ provide interesting brochure/ clear and understandable information
NIB17: N/A

BoA should give adequate IB information throughout bank branch/ staff who are able to explain and educate customers regarding IB, its usage and benefits
NIB18: inter bank transfer/ additional information such as home loan, interest, mutual fund, stock market
BoA should communicate clearly and throughout every geographic area about IB services and its benefits/ deal with user who willing to use IB but does not have facility to use IB
NIB19: full service as bank branch/ fully cover payments
BoA should educate bank customer about IB
NIB20: international transfer/ online exchange
BoA should send document to home address for update information/ need to provide demo of IB service at bank branch/ bank staff to explain how to use IB, how IB will benefit the user.
NIB21: N/A
BoA should provide more information from many channels.
NIB22: N/A
BoA should provide clear information/ information at branch is not interesting information
NIB23: some privilege for IB user/ new and up-to-date information/
BoA should promote the availability of IB service and explain clearly about the usage and its benefits/ need to create trust among bank customers for secure IB services
NIB24: update information that customer should know
BoA should send information to all customers not only customers who regularly come to bank, but also the customers who do not come to the branch/ new service or feature of IB services/ IB newsletter to all IB users/ news of the month

NIB25: N/A
BoA should catch up with customers regularly/ the majority of customers are not aware and interested in bank brochure at branch/ bank can not get together with customers/ bank should go to customer not customer come to bank.
NIB26: N/A
BoA should not do anything because I will not use IB.
NIB 27: N/A
BoA should promote more information about IB via many medias/
NIB28: N/A
BoA should create the awareness of IB services availability/ small introduction card for bank website and AsiaCyber Banking/ notebook presentation/ alert bank customers by using mass media
NIB29: payments for all credit cards
BoA should advertise more than the previous time/ no information at bank branch
NIB30: inter bank transfer
BoA should promote to all bank customers about the IB service availability/ build worth of mouth from existing IB users to the new IB users/ banks send staff to organization to educate customers about IB

Appendix C: Data analysis

C1: The initial list of emergent terms or codes from sense making

A: Departmental participation

- A1: Diversity of expertise
- A2: Shared knowledge, information and problems
- A3: Good relationship, communications, and operations

B: Equal participation

- B1: Degree of willingness
- B2: Degree of openness
- B3: Degree of understanding

C: Team orientation

- C1: Sense of ownership
- C2: Team commitment
- C3: Team learning
- C4: Team stimulation and support
- C5: Team evaluation and cross check

D: Management support

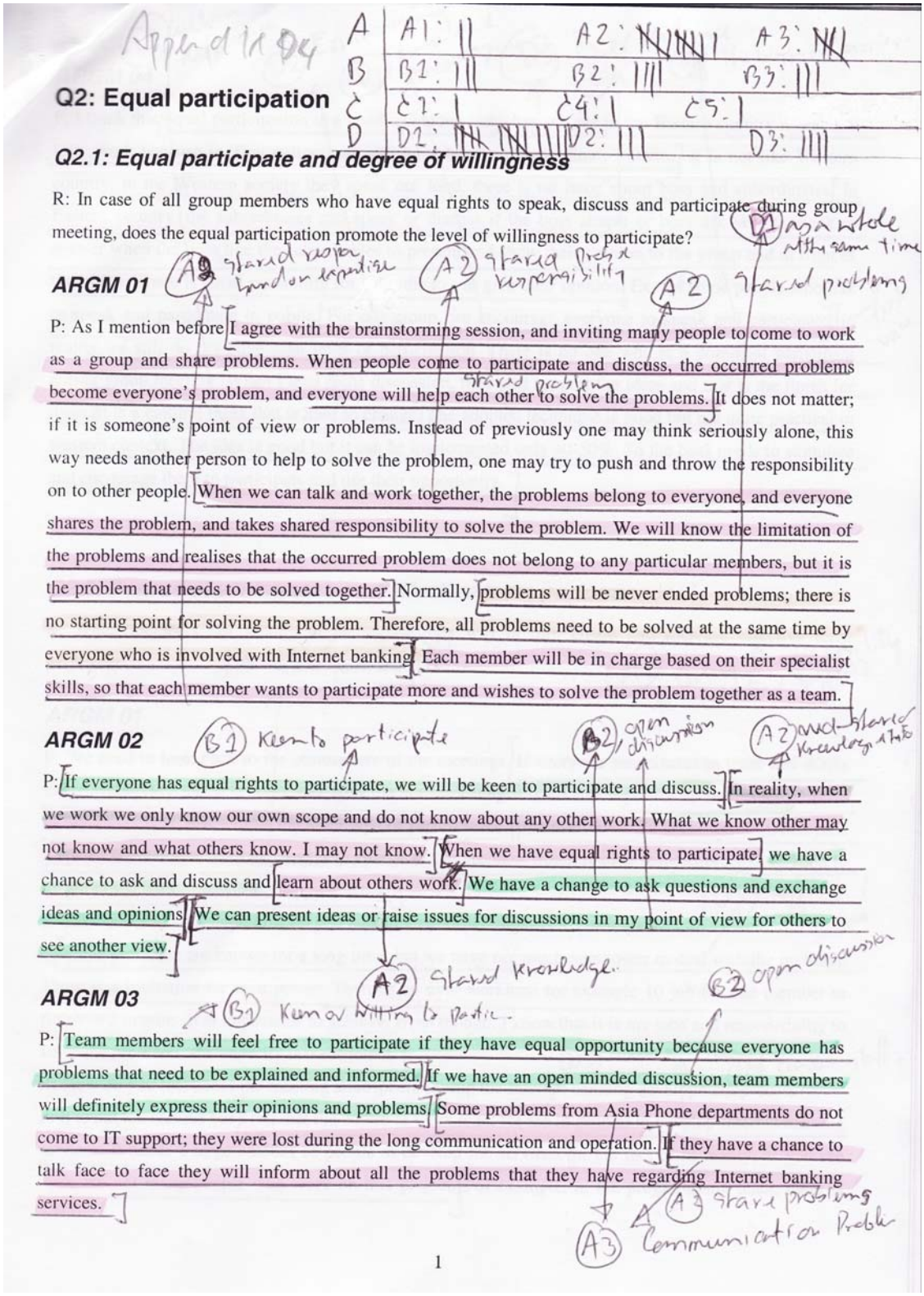
- D1: Cultural differences and power distance
- D2: Encouragement
- D3: Sufficient resources

D4: Target driven or key performance index (KPI)

E: Holistic scenario

- E1: Systems approach
- E2: Structured problems
- E3: Prioritized problems

Appendix C2: Example of coding for data analysis



Appendix D4

A	A1: ||	A2: ||||| ||||	A3: ||||
B	B1: |||	B2: ||||	B3: |||
C	C1: |	C4: |	C5: |
D	D1: |||| |||| ||||	D2: |||	D3: ||||

Q2: Equal participation

Q2.1: Equal participate and degree of willingness

R: In case of all group members who have equal rights to speak, discuss and participate during group meeting, does the equal participation promote the level of willingness to participate?

ARGM 01

P: As I mention before I agree with the brainstorming session, and inviting many people to come to work as a group and share problems. When people come to participate and discuss, the occurred problems become everyone's problem, and everyone will help each other to solve the problems. It does not matter; if it is someone's point of view or problems. Instead of previously one may think seriously alone, this way needs another person to help to solve the problem, one may try to push and throw the responsibility on to other people. When we can talk and work together, the problems belong to everyone, and everyone shares the problem, and takes shared responsibility to solve the problem. We will know the limitation of the problems and realises that the occurred problem does not belong to any particular members, but it is the problem that needs to be solved together. Normally, problems will be never ended problems; there is no starting point for solving the problem. Therefore, all problems need to be solved at the same time by everyone who is involved with Internet banking. Each member will be in charge based on their specialist skills, so that each member wants to participate more and wishes to solve the problem together as a team.

ARGM 02

P: If everyone has equal rights to participate, we will be keen to participate and discuss. In reality, when we work we only know our own scope and do not know about any other work. What we know other may not know and what others know. I may not know. When we have equal rights to participate, we have a chance to ask and discuss and learn about others work. We have a change to ask questions and exchange ideas and opinions. We can present ideas or raise issues for discussions in my point of view for others to see another view.

ARGM 03

P: Team members will feel free to participate if they have equal opportunity because everyone has problems that need to be explained and informed. If we have an open minded discussion, team members will definitely express their opinions and problems. Some problems from Asia Phone departments do not come to IT support; they were lost during the long communication and operation. If they have a chance to talk face to face they will inform about all the problems that they have regarding Internet banking services.

1

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